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Editorial Office: 1102 16th Street, N. W., Washington 6, D. C.

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Reflections, on a . . .

Silver Anniversary

Jeff McDermid

UPON scanning my hardware store calendar, I come up suddenly with the hunch that this year is the twenty-fifth since I have been pestering folks with sundry published opinions, dissertations, and observations situated in this selfsame spot and bearing the signature of one Jeff McDermid. It was back in the spring of 1927 that your editor gave me a chance to fling verbs, nouns, and adjectives around without getting into the bad graces of his readers. He kindly claims that he's never been very sorry for it.

When I reach up on the closet shelf and lug down the heavy, old-fashioned stationery file where I have cached away the ragged remnants of these printed pieces, I discover that I've been guilty of perpetrating more than 200 of them all told. That means somewhere in the vicinity of 550,000 words for the linotypers and proofreaders to tangle with and the readers to endure. Like all sinners, I approach the mourner's bench with full realization that those fulminations of a quarter of a century have been good, bad, and very indifferent.

At the onset of my "career" cast in the role of "Jeff," the handy pocketbook of agriculture was known as "Better Crops," and the home address was 40 Rector St., New York City. At first we had the custom of writing all the cute and clever things we could think of about one topic or just one definitive word—with not much attention paid to the agricultural significance therein. For example, the titles of the original year's essays were Confidence, Time, Recreation, Looks, Fairs, Neighbors, Gratitude, and (for Christmas) Generosity.

Your editor, familiar with all these pieces, often refers to one of the 1927 numbers—the one called Neighbors—as that which made them willing to experiment with me a little longer. It's the only one I shall quote from to any extent, I can assure you, so don't leave the room yet. Jeff on that occasion vowed we should all try to be good neighbors because:

"I have lived with neighbors who were only five inches of lath and plaster distant from me; and I have had to ride a cayuse for an hour to reach my nearest neighbor. Some of my neighbors have been too mean to lend me a cup of stock salt, while others have been as flush with the milk of kindness as Segis Pietertje Prospect.

"Noah Webster says the word is derived from the Anglo-Saxon 'neahgebur,' or nigh-dweller. Then he amplifies a bit by explaining that it also signifies one who is near to another by confidence or sympathy. This recalls a story I learned from the Book of Luke one somnolent Sunday long ago. Mrs. Main, the patient lady teacher of the old Tenth Ward gang, pounded the real meaning of the parable into us.

"Here it has stood for centuries in the wonderful story of the Good Samaritan, thrusting at us the challenge of whether distance or close acquaintance really determines neighborly feeling and neighborly responses. Luke tells how two travelers passed by an unfortunate man on the road to Jericho, and later how the Good Samaritan rescued him from beneath the overturned tonneau of his Damascus twin-six and rushed him to the waiting hostelry. 'Which now of these three, thinkest thou, was neighbor of him who fell among thieves?' asks Luke.

"But the Tenth Ward gang always had the right answer. Of course, they agreed that the Good Samaritan was the hero of the piece. But we lived before the community chest and the professional system of rendering relief came into vogue. We just pitched in and helped our neighbors wash their dirty linen and do other chores because we never knew when blue Monday might come to us. Now stop and ask yourself if the course followed by the Good Samaritan would have the same consequences today.

"Maybe the G. S. would be jollied a lot about doing such a stunt when the Associated Charities could be summoned from the nearest farmhouse by telephone, or the local ambulance and garage-wrecking crew would come in a jiffy. Moreover, would such a bedraggled, unknown, and injured stranger be admitted at the hotel on the word of a mere ubiquitous stranger? Would the innkeeper of today be satisfied without calling up the police department, the Chamber of Commerce, or the Y. M. C. A. for advice? Would not the extremists of the radical press berate the G. S. as an influential citizen of the state who had done nothing whatever to help make the highway to Jericho safe and all curves marked plainly?

"We must not forget that we have something to give as well as to gain by cultivating the acquaintance of our neighbors. Wherever you go you are sure to become somebody's neighbor. Be careful—he might like you! And when it's all over, we shall find corner lots and plenty of neighbors in the cemetery."

TWO events stand out as background for that year of 1927—the world poultry congress at Ottawa, Canada, and the venturesome 33½-hour voyage of Aviator Charles Lindbergh to Europe in the Spirit of St. Louis. I attended the former and was crushed in some of the throngs that went wild over Lindy. I remember that I wrote one of the first "Jeffers" in a little sunken garden in the suburbs of Ottawa—entitled Fairs. I could pose as an expert in that field insofar as trudging the tanbark after the prize-winning cattle is concerned, as well as surviving the kind of poisonous fare they often served on the midways.

The basic job that earned the upkeep of my family was writing for a state farm journal. So, the assignment handed me for a little extra practice helped pay the groceries and gave me a chance to let go and speak right out in meeting louder than was considered diplomatic for a farm paper scribe.

From personal experience I can surely say to any young plugger that the real method of trying your writing wings is

to fly into the face of the public with all the gas you've got. The first fall need not be fatal. Of course, that's not all there is to the business. One has to dig up some ideas—probably some of the best of them coming from old memories. The past, you know, is always easier to read about and more restful than the present or the future—especially these days.

I do not offer my own testimony as coming from a very successful authority wont to be quoted and admired. I merely pass on the hunch as of one of the rank and file—just how rank you have to decide.

Happily, most of us Americans have a rather universal heritage, numerous parallel experiences, and a general attitude toward everyday living that is much the same. This fact gives the writer of what are called "informal essays" a chance to strike a lively or a plaintive note or to bang out a resounding chord—as the moment and the subject suit—without losing the reader in a cloud of verbal fog.

The best rule in doing your darndest is to keep in step with the reader's own reactions. You sort of scribble over his shoulder and let him set the pace. He really does it for you, if both of you are used to eating out of the same dish, with the same kind of kinfolks and country traditions behind you.

TO put it contrariwise, a guy can't very well do a good scientific screed unless he has lived with science and knows what the average laboratory chap's reactions will be, and what questions he is apt to raise. Just so, one can hardly furbish up a good job of sunburnt country communion and get the whimsical slant of the ruralite into the document unless the writer has a fairly good germination of hayseed in his own scalp. They'll take a lot of ribbing from a fellow countryman if he shows that he has the signs and passwords.

It will stand you in good stead to know how to manipulate the brakes on your typewriter. The least bit of treading on sensitive toes, or ruffling religious, partisan, sectional, or fraternal feelings soon slams you into the deep, dark doghouse. You write to be remembered, not reviled. This doesn't mean, of course, that you cannot argue a little in your articles—provided you know where to stop.

You see a writer can hope to avoid some of the anger and heckling which falls to the lot of the average stump-speaker. At least, the outspoken critic can't butt in and stop him from proceeding; and the heckler by letter never enjoys the fun of attacking somebody on the podium with a big crowd beholding it.

Most of your unseen reading audience seldom ever tell you if they agree or disagree or whether they like the stuff or hate it. This reminds me of a story about a friend of mine who finished what he thought was a brilliant after-dinner speech. He was warmly thanked and congratulated by the chairman and his cohorts on the arrange-

(*Turn to page* 41)

Better Potato Yields in Western Maryland[1]

By J. H. Axley and H. B. Winant

Agronomy Department, Maryland College of Agriculture, College Park, Maryland

IT has long been an established fact, climatically speaking, that western Maryland is very similar to the potato-producing area of Maine. No doubt this section of Maryland must have been recognized as a possible region for potato production by scientists at the Maryland College of Agriculture shortly after this institution was chartered in 1856. A comparison of the climate in the two areas is given in Table I.

TABLE I.—A CLIMATIC COMPARISON OF POTATO PRODUCTION IN WESTERN MARYLAND AND NORTHERN MAINE

Mean July temperature	Rainfall (av.) in inches			No. of growing days
	Annual	July	August	
Western Maryland—67.4°F	45	4.71	4.26	116–124
Maine—67.3°F	36	4.2	3.56	107–117

The above figures would indicate that these climatic conditions for potato production favor western Maryland. However, the yields in 1949 were 154 bushels per acre for western Maryland and 450 bushels per acre for Maine. Therefore, the major environmental difference affecting potato production would probably relate to the soil.

In an effort to solve these problems the Agricultural Experiment Station established potato plots in western Maryland shortly after the close of the past century. The results shown in Table II give an indication of the yields obtained under various types of treatment over a 33-year period.

Garrett County, wherein the experimental potato plots were established, showed an average yield of 78 bu/acre in 1924 and 154 bu/acre in 1949. Although the experimental yields were considerably better than the county average, they were still not satisfactory in comparison to yields obtained elsewhere, and it seemed desirable to design a new experiment which would fulfill certain fundamental considerations:

1. To supply adequate amounts of fertilizers to account for plant needs and soil retention;
2. To supply nutrients to the plant in different ratios throughout the growing season;
3. To incorporate potato production in an adequate and profitable rotation.

A good crop of potatoes, such as 600 bushels, will remove from the soil 120 lbs. of nitrogen, 30 lbs. of P_2O_5, and 195 lbs. of K_2O. Soil tests indicate that

[1] Miscellaneous Publication 132, Contribution 2359, of the Maryland Agricultural Experiment Station, Department of Agronomy.

TABLE II.—BEST RESULTS OF PREVIOUS POTATO STUDIES

Time of research	Best treatment	Yield	Investigator
1917–1922	20 T. manure/acre	209	McCall
1935–1939	5–8–7 1,000 lbs/acre	203	Metzger
1940–1945	4–10–10 1,000 lbs/acre	258	Thomas
1948–1950	6–6–6 1,400 lbs/acre plus 1 year of green manure	303	Thomas

more plant nutrients than the crop contains must be applied to obtain high yields. This is because both plant and soil compete for the nutrients. However, it is not desirable to apply all the fertilizer materials in one treatment as the plant withdrawals vary throughout the growing season. Also, there is a continuous removal of nitrogen by leaching and of phosphorus and potassium by soil fixation. To avoid this, fertilizer was row-applied, broadcast, and sprayed.

Potatoes require a relatively large phosphorus supply in the early stages of growth. To devise a method to meet this need, an experiment was started in 1950 in which a 3-12-12 fertilizer was distributed in the row. This fertilizer is high in phosphate in relation to what the potato plant will remove later in the season.

Potatoes also need nitrogen. They can often obtain a fair proportion of their nitrogen from soil organic matter which may supply as much as 125 to

TABLE III.—LATE POTATOES TREATMENTS: OAKLAND

Row application 600 lbs/acre	Broadcast 1,000 lbs/acre	Supplemental nitrogen lbs/acre sidedressed	N in spray	Yield in bu. per acre in 1950	1951
			88	270	256
3–12–12			88	353	345
3–12–12	0–0–20		88	355	325
3–12–12	0–6–0		88	367	332
3–12–12	0–6–20		88	404	401
3–12–12		150	88	450	362
3–12–12	0–6–20	150	88	512	416
3–12–12	0–6–20	250	88	516	412
600 lbs/acre	2,000 lbs/acre	sidedressed	spray		
3–12–12	0–6–20	250	88	504	420
3–12–12	0–6–20	150	88	534	393
			L. S. D. at 5% level	108	64

Fig. 1. Yield—344 bu. per acre. Fertilization—88 lbs. N and 600 lbs. 3-12-12 in row.

225 lbs. of nitrogen per acre per year. However, where conditions are such that the previous crops were primarily non-leguminous and the leaching rate is relatively high, larger than normal quantities of additional nitrogen must be provided. This nitrogen should be applied to meet two distinct requirements:

(1) A constant supply throughout the growing season;
(2) A relatively large supply 50 to 60 days after planting.

The first need was satisfied by adding 8.8 lbs. of nitrogen in the form of urea in each spray. There were 10 of these sprays throughout the growing season. The second need was met by sidedressing with nitrogen.

Finally, potatoes need an abundant supply of potash in relation to a more limited supply of phosphorus in the later stages of growth. To meet this need, a fertilizer with a high-potash ratio should be broadcast and disked in, prior to planting. An 0-6-20 is a fertilizer of such a ratio. The results of the use of this system of fertilization are shown by the yields in Table III.

The yields presented in Table III appear to justify the methods of fertilizer applications that have just been discussed. Where nitrogen in the spray was the only fertilizer material applied, the lowest yield was recorded. However, this was 116 bu. above the county average, indicating that a constant supply of nitrogen throughout the growing season was giving marked increases in yield.

The 3-12-12 fertilizer containing the phosphorus for early growth, plus the spray nitrogen, added some 80 bu. to the potato yield. The 0-6-20 fertilizer containing the potash necessary for starch formation in the later stages of growth, plus the 3-12-12 row application and the nitrogen spray, added another 50 bu. to the yield.

Sidedressing of potatoes with additional nitrogen such as 150 lbs. per acre further increased yields.

The question has been posed as to whether such high rates of fertilizer application on potatoes would not be a waste of money in seasons of drought. The 1950 season had a three-week drought at the height of the growing season. The 1951 season was really a

Fig. 2. Yield—614 bu. per acre. Fertilization—600 lbs. 3-12-12, 2,000 lbs. 0-6-20, 250 lbs. N sidedressed, 88 lbs. N in spray.

test. The drought lasted more than two months. During this period the rainfall was about ½ of normal and it was one of the worst droughts on record. Table IV indicates that profitable returns may still be had from these rates of fertilizer applications.

The third objective was to establish a rotation in which profitable potato production was combined with crops of oats and clover for livestock feeding. Oats are used because it is often too late to sow a fall grain in this region after harvesting potatoes and because oats do well in the cool, moist climate of western Maryland. Climatic conditions also favor the development of splendid stands of red clover if sufficient plant food is available.

The fertilizer for these two crops is applied to the oats and is of such quantity and ratio as to adequately replace the nutrients removed by both oats and

(*Turn to page* 41)

TABLE IV.—INCREASED RETURN IN DOLLARS DUE TO THE USE OF FERTILIZERS

Treatment	Yield bu/acre	Increase over basic treatment bu/acre	Cost of additional fertilizer dollars/acre	Increased return** dollars/acre
		1950 crop		
Basic*	270			
Moderate	404	134	34	127
High	512	242	56	234
		1951 crop		
Basic*	256			
Moderate	401	145	34	270
High	416	160	56	280

* Basic treatment consisted of spray nitrogen alone with which all plots were treated.
** Values used potatoes $1.20 per bu. in 1951; $2.10 per bu. in 1952.

Four Years of Fertilizing Oats[1] in Minnesota

By J. M. MacGregor

Soils Department, University of Minnesota, St. Paul, Minnesota

NEARLY five million acres of oats are grown annually in Minnesota. This compares to slightly over five million acres of corn, which is considered to be the most important crop in the State. Despite the immense acreage of oats, this crop has been consistently treated as "corn's poor cousin" in relation to the attention received. Usually all of the available farm manure and essentially all of the commercial fertilizer are lavished upon the corn, the oat crop being largely dependent upon what fertility remains in the following year. This treatment is reflected in that the average yield of oats grown in Minnesota is approximately 38 bushels per acre. The yield of oat straw is also comparably low, a by-product used for both feed and bedding on Minnesota farms.

The oat plant root system is a strong forager for plant nutrients. This fact has given rise to the misconception that the crop does not need direct fertilizer application and would do very well on the residue remaining from fertilizing corn in the previous year. The hard fact is that most corn fertilizers generally do not have enough nitrogen for the corn itself, although there is often some fertilizer phosphate and potash residue remaining for the oat crop in the year following. In this way, the oat plant is entirely dependent upon nitrogen released from the soil organic matter, which is produced at a relatively low rate in the cool temperatures of the early oat-growing season. The vigorously feeding root system of the oat crop will make at least some use of previously applied phosphate and potash remaining in the soil, but the growth is often limited by nitrogen deficiency. The general opinion in Minnesota has been that the oat plant is entirely capable of foraging for nutrients by itself. The conception of lavishing everything upon the corn crop is gradually changing, since it is apparent that fertilizer applied to oats is also highly beneficial in establishing good stands of the commonly seeded companion hay crop.

After several years of preliminary investigation, a standard set of fertilizer treatments for oats was made up early in 1948 and applied to different fields each year through 1951. The large scale of this investigation (83 fields during the four years) was only possible with the active cooperation of county agricultural extension agents and instructors of veterans in agriculture in the selection and the handling of the fields. The fertilizer was supplied and packaged by the Division of Soils, Minnesota Agricultural Experiment Station. Table I gives an explanation of the treatments in terms of available commercial fertilizer used on all fields in a randomized block design with four replications.

The fields were selected at random and could be considered to be average over the area under study. The county agricultural extension agent of necessity often deals with farmers of above

[1] Paper No. 2803 of the Scientific Journal Series, Minnesota Agricultural Experiment Station.

Fig. 1. Location of the 83 farm fields used in the experiment.

average ability, since it is difficult for him to reach many of the substandard farmers. On the other hand, the tendency of the instructors of veterans is to try to place experimental fields with on-the-farm trainees who have recently purchased run-down farms and are faced with a major fertility problem. Since the cooperation of both of these individuals was secured in field selection, a reasonable mean fertility was obtained and the average unfertilized oat yields in general compared quite well with the 12-year State average previously mentioned. Figure I gives the location of the 83 farm fields used during the course of the experiment.

The soil textures varied from a fine sandy loam to silty clay loam. The fertilizer treatments were applied by the author or another representative of the Division of Soils with the aid of the cooperators previously mentioned. In the majority of the cases the fertilizers were spread after the farmer had prepared the seedbed and immediately prior to the seeding. All stakes were then removed and the farmer seeded the plot area with the rest of the field, using his own seed. With a few fields, the fertilizer was topdressed on the freshly seeded oats within a few days after seeding. At harvest time three square yards were cut from each of the four replicates of each field. The samples were hauled to University Farm, St. Paul, where they were dried, threshed, and the grain and the straw yields calculated.

In the upper Mississippi Valley region, oats are usually seeded in April and harvested in July. Maximum production is usually associated with a cool, relatively moist growing season. Hot, dry weather in May discourages tillering and ultimate oat yield, as well as the beneficial effect of applied fertilizer.

TABLE 1.—COMMERCIAL FERTILIZER TREATMENTS USED ON THE 83 EXPERIMENTAL OAT FIELDS

Nutrients applied N P_2O_5 K_2O pounds per acre	Corresponding commercial fertilizer	Rates of application approximate pounds per acre
0– 0– 0		
10– 0– 0	Am. nitrate	30
20– 0– 0	Am. nitrate	60
40– 0– 0	Am. nitrate	120
0–40– 0	0–20–0	200
0– 0–40	60% muriate of potash	66
0–40–40	0–20–20	200
10–40– 0	11–48–0 or	90
	4–16–0	250
20–40– 0	Am. nitrate	60
	and 0–20–0	200
	or 8–16–0	250
40–40– 0	Am. nitrate	120
	and 0–20–0	200
10–40–40	5–20–20	200
20–40–40	6–12–12 or	325
	8–16–16	250
20–40–20	Am. nitrate	60
	and 0–20–10	200
	or 8–16–8	250
40–40–40	10–10–10	400

Results

Twenty-three fields in eastern Minnesota were fertilized in 1948, the more southern being situated on soils of wind-laid origin, and the northern on podzolized soils derived from glacial material. Since all of these soils were

developed under forest vegetation, the natural supply of organic matter and available nitrogen is not high. The minimum, maximum, and the average unfertilized yield with the effect of fertilizer treatment on oats and the prevailing weather are shown in Table II.

TABLE II.—THE EFFECT OF FERTILIZING OATS IN MINNESOTA—1948, 23 FIELDS WITH FOUR TREATMENT REPLICATES

Nutrients applied N P_2O_5 K_2O pounds per acre	Bushels per acre		Average
	Minimum	Maximum	
	Yields on unfertilized soil		
0– 0– 0	12.4	72.0	42.1
	Yield increase produced by fertilizer		
10– 0– 0	−12.4	20.5	3.5*
20– 0– 0	−6.7	22.3	6.1**
40– 0– 0	−11.1	24.2	7.2**
0–40– 0	−2.5	18.2	3.9**
0– 0–40	−14.5	13.1	2.0
0–40–40	−11.5	17.3	6.1**
10–40– 0	−8.9	23.1	6.4**
20–40– 0	−3.6	26.9	10.2**
40–40– 0	−4.5	34.6	12.5**
10–40–40	−3.0	27.8	7.2**
20–40–40	−2.8	32.2	10.8**
20–40–20	−2.4	29.4	10.5**
40–40–40	−2.2	36.4	14.8**

* Significant 3.3 bu.
** Highly sig. 4.3 bu.

Growing season weather

Month	% of normal rainfall	Deviation from normal mean temperature
April	101	+2.7° F.
May	37	+0.5° F.
June	84	−1.0° F.
July	69	+0.8° F.

Native fertility, previous soil management, and available moisture varied considerably with the unfertilized yields ranging from 12 to 72 bushels of oats per acre. The low rainfall in May seriously reduced tillering, final yield, and the fertilizer effect on many fields. The minimum fertilizer effect column indicates that on some fields, applications of either nitrogen or potash alone or of phosphate-potash produced probably significantly depressive effects upon the oat yield. The application of either one or of two nutrients induced a deficiency of the nutrient or nutrients not included in the fertilizer treatment, and this substantially lowered yields on these fields. This effect was removed with the application of complete fertilizer, the small yield decreases occurring on one field receiving very limited rainfall. As might be expected, nitrogen produced the largest yield increase of the three nutrients when applied alone, but studies have shown this treatment to be detrimental to both yield and quality of the following legume hay crops. Applications of phosphate, phosphate-potash, nitrogen-phosphate, and nitrogen-phosphate-potash have been markedly beneficial on both the yield and the quality of succeeding hay crops.

In 1949, the investigation was broadened to include the prairie soils of southwestern Minnesota with the different fertilizer treatments being applied to 42 oat fields. The results are shown in Table III.

Higher than normal spring temperatures combined with low rainfall until late June materially affected 1949 oat production in southern Minnesota. The average of unfertilized oat yields, (43.6 bushels) was slightly higher than in 1948 due to inclusion of fields in the more naturally fertile prairie region.

Some of the experimental areas received essentially no rain during the entire growing season. This tended to accentuate the unfavorable effect of using straight fertilizer materials, especially with either phosphate or potash alone. Mixed fertilizers having either two or three nutrients present produced the best average results.

The early part of the 1950 season was unusually cool and moist, and fields could not be worked until nearly

Fig. 2. Applying fertilizer in southeastern Minnesota.

the middle of May. A dry, warm June followed. The lateness and the rapidity of the oat seeding made it physically impossible to fertilize a large number of experimental fields, and the results given in Table IV represent 15 oat fields.

The late seeding followed by warm, dry weather at tillering seriously affected oat yields and fertilizer effect. None of the single nutrient treatments on the average were significantly effective for increasing yield, although on several individual fields these treatments were significant. The complete fertilizer mixtures produced the best average results.

In 1951, only three oat fields were fertilized, and the general fertility level of these fields would represent the more poorly managed soils of southern Minnesota. These results are shown in Table V.

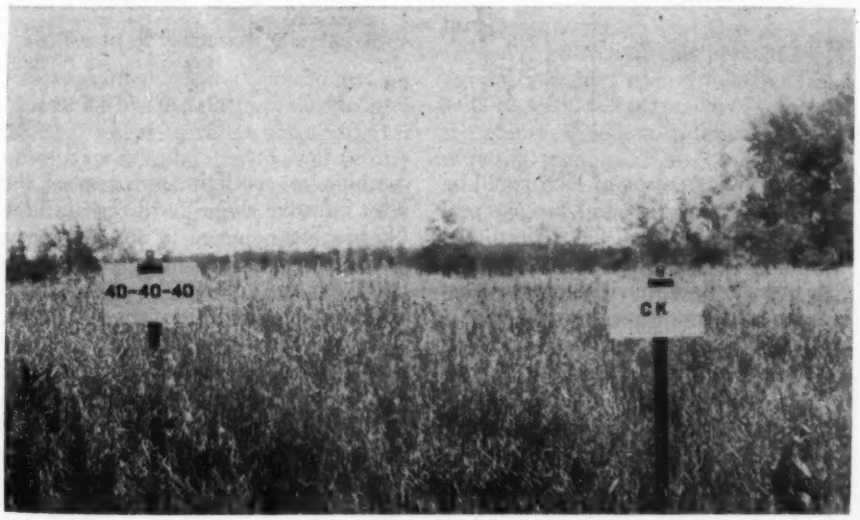

Fig. 3. Fertilizer response in east-central Minnesota.

TABLE III.—THE EFFECT OF FERTILIZING OATS IN MINNESOTA—1949, 42 FIELDS WITH FOUR TREATMENT REPLICATES

Nutrients applied N P_2O_5 K_2O pounds per acre	Bushels per acre		Average
	Minimum	Maximum	
	Yields on unfertilized soil		
0– 0– 0	16.3	71.1	43.6
	Yield increase produced by fertilizer		
10– 0– 0	−8.3	20.7	1.9
20– 0– 0	−15.3	15.3	2.6*
40– 0– 0	−14.0	19.3	3.4**
0–40– 0	−12.4	16.9	2.0
0– 0–40	−11.9	10.8	0.0
0–40–40	−9.1	13.5	3.2**
10–40– 0	−10.1	19.0	3.7**
20–40– 0	−7.2	22.4	5.2**
40–40– 0	−5.7	23.5	7.6**
10–40–40	−7.0	17.0	3.1**
20–40–40	−10.4	28.4	5.7**
20–40–20	−10.3	27.9	4.9**
40–40–40	−6.6	30.5	8.5**

* Significant 2.2 bu.
** Highly sig. 2.9 bu.

Growing season weather

Month	% of normal rainfall	Deviation from normal mean temperature
April	35	+1.9° F.
May	60	+3.1° F.
June	99	+2.4° F.
July	154	+1.2° F.

TABLE IV.—THE EFFECT OF FERTILIZING OATS IN MINNESOTA—1950, 15 FIELDS WITH FOUR TREATMENT REPLICATES

Nutrients applied N P_2O_5 K_2O pounds per acre	Bushels per acre		Average
	Minimum	Maximum	
	Yields on unfertilized soil		
0– 0– 0	25.8	72.2	42.1
	Yield increase produced by fertilizer		
10– 0– 0	−3.3	11.7	1.5
20– 0– 0	−9.9	16.0	2.6
40– 0– 0	−6.6	13.4	2.9
0–40– 0	−9.7	11.0	2.1
0– 0–40	−13.6	5.6	−0.5
0–40–40	−6.5	11.4	2.0
10–40– 0	−6.0	11.8	4.7**
20–40– 0	−3.3	12.0	4.9**
40–40– 0	−8.5	18.1	6.2**
10–40–40	0.4	13.1	5.7**
20–40–40	−5.0	10.7	6.0**
20–40–20	−3.3	20.0	5.8**
40–40–40	−0.5	22.0	7.7**

* Significant 3.0 bu.
** Highly sig. 3.9 bu.

Growing season weather

Month	% of normal rainfall	Deviation from normal mean temperature
April	100	−9.4° F.
May	139	−3.0° F.
June	36	+0.9° F.
July	147	+3.8° F.

The growing season of 1951 could be considered as nearly ideal for oat production. The three fields fertilized were very deficient in available nitrogen, but all three nutrients were necessary for maximum oat growth. There are many of such poorly managed oat fields in Minnesota.

Discussion

The common practice of seeding oats following commonly fertilized and manured corn and the relatively cool temperatures of the oat-growing season combine to spotlight nitrogen as the most effective single fertilizer nutrient. No lodging occurred in any field even when 40 pounds of nitrigen were applied, but the addition of phosphate to the nitrogen seemed to stiffen the straw. Although the yields of oat straw have not been included in this paper, the production of this valuable organic matter was affected by fertilizer treatment in much the same way as the grain. However, it is evident that the fertilizers containing only one of the three

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Productive Soils Need More Fertilizer

By H. B. Vanderford

Agronomy Department, Mississippi State College, State College, Mississippi

THE economic period in which we are living is demanding more and more food and fiber crops. Annual increase in the population of the United States alone leads our attention to the need for more food. There is little new land to bring into production. When we consider these facts, it becomes evident that increased production per acre or unit of land offers our best possibility of meeting the requirements.

Great progress has been made along this line during the last decade by the process of fitting or producing many of the major crops on land which was well suited for the production of each one. Farmers and ambitious agricultural leaders have changed the patterns of land use by the application of research and observational data. In no section of the country has this progress been greater than in the South.

Different Productive Capacities

Soils under natural conditions are endowed, by the factors which produced them, with certain capacities for production. Although this soil feature has been recognized by some research workers for a long time, it is not fully appreciated by a great number of agricultural workers, especially in making fertilizer recommendations.

Soil variation or the way that land behaves under different treatments has been observed by farmers and ranchers ever since the dawn of agriculture. We have long recognized that there are many different kinds of land in every county, state, and nation. The various classes of land have different management requirements. In spite of all these differences it has been assumed by some that all soils planted to cotton or corn or tobacco or other crops should receive the same application of fertilizers within a county or physiographic region. In order for this to be true, the important soil properties which directly influence plant growth would have to be relatively uniform throughout the range of soils on which a certain crop is grown or the application of fertilizers would have to iron out the differences in soils. Neither of these assumptions, of course, is true. We therefore must recognize that since soils differ in their properties, they also differ in their ability to efficiently use fertilizers. It is reasonable to assume, and preliminary results indicate, that soils differ in their capacities to use fertilizers just as they differ in their capacities to hold moisture or in their lime requirements.

It may be well at this point to recall the difference between productivity and soil fertility. Productivity refers to the ability of soils to produce crops by utilizing plant nutrients, both natural and applied, for growing crops as needed for high yields, and under a definite set of management practices. Fertility refers to the supply or "storehouse" of plant nutrients in the soil which may be utilized by plants under favorable conditions. Some soils have a high fertility status, but because of other factors are not very productive. It is a difficult matter to use or deliver the plant nutrients held in some soils.

The productive capacity of soils in suitable uses is governed by a combination of soil characteristics. Among

Fig. 1. Cotton with a uniform application of fertilizer growing on two kinds of land. Good production was obtained on the good cotton land; very low yields on the land poorly suited for cotton. (Courtesy of Dr. O. T. Osgood)

these are soil depth, drainage, texture, moisture relations, organic matter, slope, and the like. Every soil in its natural state represents a combination of these characteristics which form a field or plot of land. The productive capacity governs the amount of fertilizer a soil can efficiently use in a given use. The commonly called "poor soils" cannot always use as much fertilizer in a certain use as can the "good" or more productive soils. (See Figure I.)

This may appear to be a bit strange, but it is only a natural thing. A good example is found among the soils which are used for the production of corn in the South. Some deep, moist soils with favorable texture, structure, relief, etc., have the capacity to produce 130 bushels of corn per acre and can therefore use as much as 200 pounds of nitrogen when potash and phosphorus needs are satisfied. Other soils, when given the same treatment and on the same farm, will not produce more than 50 bushels per acre. In other words, the second soil has a capacity to use about 100 to 120 pounds of nitrogen efficiently when used for corn production. It would be foolish to give both soils the same fertilizer treatments when used for this crop. The same could be said for other crops that are planted on soils which differ widely in important characteristics. By recognizing the productive capacities of the soils, we are in position to get the most efficiency from the fertilizers used and increase the production of major crops on fewer acres.

Fertilizer Needed and Profit Depend on the Soils

The high yields which have been obtained on many acres have been encouraging and are reflections of soils producing adapted crops which have been well fertilized. Good examples are high yields reported lately for crops like cotton and corn. The extent of the acreage producing the high yields is still somewhat limited, however, in the various states. This is apparent when one considers the average yields per acre on a state basis. In the State of Mississippi where many 100-bushel patches can be found, the average yield of corn was about 21 bushels per acre in 1951. The average yield for the 13 Southern States was about 26 bushels

per acre. There are many reasons for this, one being that many acres better suited for other crops are utilized for corn production.

The data in Table I, collected under the leadership of Dr. O. T. Osgood, Professor of Agricultural Economics, State College, Mississippi, indicate the importance of putting the right crop on the right land.

Table I shows the advantages of growing corn on land well suited for this crop and the need for very heavy rates of fertilizers. In the area where these studies were conducted, a wet year, 1950, which was favorable for high yields of corn, was followed by a very dry year. It should also be pointed out that these studies were made on T. V. A. Test Demonstration Farms and complete fertilizers had been applied on these soils prior to the study. This probably accounts for the fact that nitrogen alone produced almost as much as did the complete fertilizer. It should be remembered that both potash and phosphorus are usually recommended for high corn yields.

From the data presented it is clear that the soils were highly important from the standpoint of yields per acre and the income obtained. On soils well suited for corn production, high yields were produced both years (wet and dry). The income made per acre above the cost of the fertilizer was over $100 for the heaviest rates of fertilizers. On these soils the most money was made where the most fertilizer was used.

In direct contrast were the results obtained from similar tests conducted on soils which were not well suited for corn production and termed "average cotton soils." In this case the yields were considerably lower in 1951, the dry year, than in 1950, and the two-year average was also lower than for the better corn soils. Also, the lightest applications of fertilizer used on the poorer soils produced more income per acre above the cost of the fertilizer than the heavier rates. The data indicate the importance of the nature of the soil on which corn is planted from both the viewpoints of yield per acre and profit which may be realized.

The corn plant is sensitive to drought and shallow soils. Soils that are certain

TABLE I.—RESULTS OF CORN TESTS ON FOUR TEST DEMONSTRATION FARMS, TWO REPLICATIONS, UPPER COASTAL PLAIN SOILS, IN THREE COUNTIES, 1950 AND 1951 *

Kind of soils	Fertilizer**	Inches spacing	Yield in bushels per acre			Average value above fertilizer cost
			1950	1951	Av.	
Best "Corn" Soils (Deep, moist soils)	Moderate complete	18	94.8	69.0	81.9	$95.00
	Heavy complete	15	105.6	73.9	89.7	97.42
	Very heavy complete	12	124.2	79.1	101.6	104.95
	Moderate N only	18	87.4	72.4	79.9	99.17
	Very heavy N only	12	109.4	72.6	91.0	103.32
Average "Cotton" Soils (Somewhat high and dry soils)	Moderate complete	18	70.2	23.7	46.9	45.65
	Heavy complete	15	71.8	22.2	47.0	37.52
	Very heavy complete	12	74.3	22.4	48.3	31.24
	Moderate N only	18	64.8	19.6	42.2	45.45
	Very heavy N only	12	68.4	18.7	43.5	37.27

* Prices used in 1950 were $1.25 per bushel for corn, $2.50 per cwt. for 8-8-8, and $3.00 cwt. for ammonium nitrate. In 1951 they were $1.50 per bushel for corn, $3.00 cwt. for 12-8-8, and $3.50 cwt. for ammonium nitrate.

**Amounts of complete fertilizer ranged from 98# to 204# for N; from 24# to 64# for P_2O_5; and from 24# to 64# for K_2O.

to produce good yields most every year are usually deep so that roots, air, and water can penetrate freely into them. They have a high capacity for storing and releasing available moisture, respond to fertilization, and occur on level to gently sloping topography. An adequate amount of good corn land is not found on all farms. A farmer is often compelled to plant corn on land that is only fair or poor for this crop. In these cases, the operator should realize the difficulty involved, apply fertilizer, and thin the corn accordingly. Treating the land according to its productive capacity will decrease the cost involved and make the crop more profitable. When yields and profit fall to certain levels, the land should be used for some other crop.

Crop rotation is a subject involved in all farm management work. The suitability of the soils on a farm for the production of the crops grown should be considered carefully before certain rotations are recommended. Figure 2 shows by bar graphs how the incomes above the fertilizer cost can vary from well-fertilized crops of corn and cotton when produced on different kinds of land.

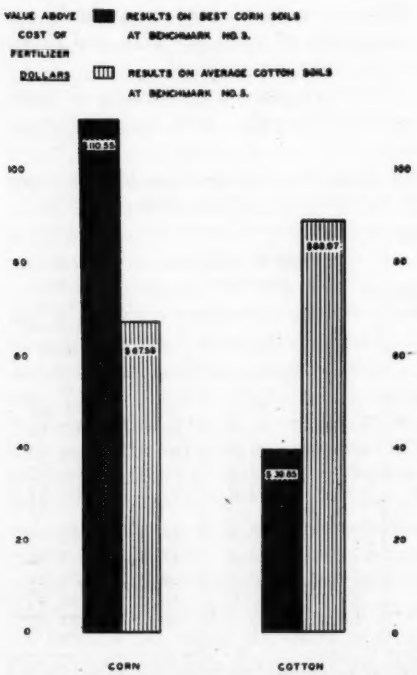

Fig. 2. The incomes produced with crops like cotton and corn depend on the soils on which these crops are grown. (Courtesy of Dr. O. T. Osgood)

It can be seen from this figure that cotton on cotton land produced enough cotton to make about $89 per acre above the cost of the fertilizer used. On the good corn land, however, cotton treated in the same way produced less than one-half as much income per acre. It is interesting to compare the income produced by the corn on good corn land with the income produced by cotton on the same kind of land. The corn produced an income of about $110 per acre above the fertilizer costs while the same land planted in cotton produced only $40 per acre. This indicates that the suitability of the soils should be considered before a rotation involving corn and cotton is recommended.

Sound and Usable Land Classification

In order to meet the needs and demands for agricultural products during the coming years, each acre of land should be utilized according to its suitability for crop production. Since it is apparent that different soils have different productive capacities for various crops, the first problem in a program involving increased production is the matter of land classification.

There are many systems of land classification in use today and each system depends on the objective of the person or agency using it. It would be difficult for one system of land classification to serve all purposes and objectives. In a program where high production is the major object, the suitability of the soils for the production of the various crops is a logical criterion on which to group the soils into land classes. We then have a general basis for obtaining information on the productive capacity of each signifi-

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Science and the Cow Look at Pasture Forage as a Feedstuff*

2. Pasture Variations and Their Effects on the Feeding Program

By Marshall E. McCullough and O. E. Sell

Animal Industry Department, Georgia Experiment Station, Experiment, Georgia

THE most common summer pasture for dairy cattle in the Piedmont section of Georgia is either Bermuda or Dallis grass with white or ladino clover. For winter grazing a common pasture mixture consists of oats, rye grass, and crimson clover. Variations from these mixtures are used, and improvements in them are being made; however, this discussion will be limited to the above-mentioned forage crops because of their wide general adaptability and usage.

As the soil and air temperatures rise in March, April, and May, and days become longer, white clover (or any of the cool-weather legumes) grows more rapidly, attaining growth rates of 20 to 36 pounds or more of dry matter per acre per day. Since the forage is 80 to 100 per cent clover during this period it is high in crude protein—20 to 28 per cent.

A spring drought of variable duration in this area usually starts in May and extends into June. This is usually a period of marked changes in the growth rate of forage and in the botanical composition of the sward. The cool-weather clover thins out appreciably, usually constituting around 20 per cent of the forage; and the summer grasses, Bermuda and Dallis, start active growth. Lack of rainfall may hold forage growth rate to around 10 to 15 pounds or less of dry matter per acre per day. It should be noted that this is a wider range than the average data shown in Figure 1. It should be pointed out that clover forage cannot be safely accumulated to any great extent by deferred grazing for use during this spring drought period. When hot, dry weather prevails, the cool-season clovers wilt and most of the foliage is lost. Certain caged pasture clipping data have shown losses of three-quarters of a ton dry matter per acre during this spring drought period when it was not grazed. Supplementary irrigation could maintain forage production and most of the stand of white clover during this period.

Forage growth usually is at a maximum during late June and July due to adequate rains, high temperatures, and nitrogen becoming available from the spring clover-fixed nitrogen. Rate of forage growth may reach 40 to 65 pounds of dry matter per acre per day during this period. The pasturage may be watery at times due to excess rainfall, and livestock performance has frequently declined apparently as a result of the higher water content of the pasture forage. From 20 to 50 per cent of the forage may be clover, the actual proportion depending upon weather conditions and on fertilizer practices.

Rainfall decreases after July, some-

* No. 2 in a series of articles.

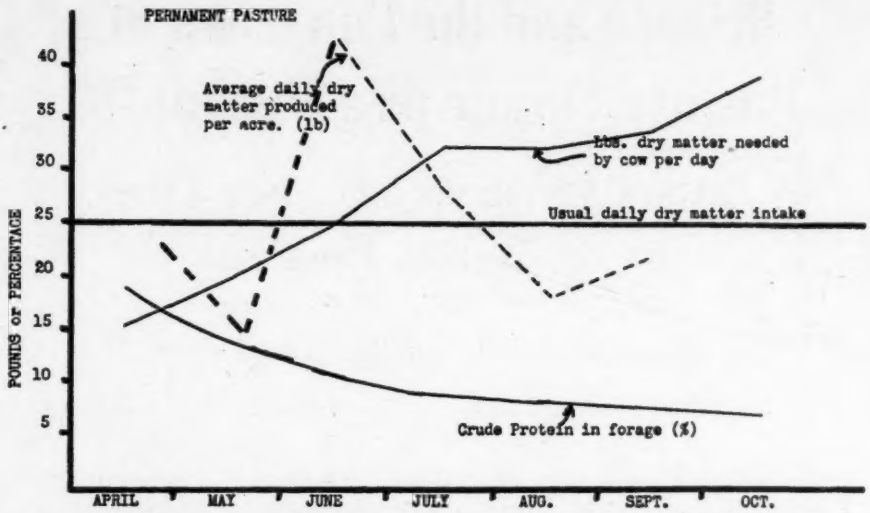

Fig. 1. Factors affecting the feeding program on permanent summer pasture. (Data stated in terms of the amount of forage required to furnish daily protein requirement.)

times still being adequate in August, but usually being very deficient in September. Insufficient rainfall in late summer results in a marked decline in forage production. If rains occur at this time (usually resulting from Gulf of Mexico hurricanes) some regrowth of pastures takes place. There is also a marked reduction in the percentage of crude protein in the forage at this season, resulting from decreased clover in the pasture stand. Experiments have shown that the nitrogen accumulated in the soil by the spring clover growth is largely depleted by September.

Nitrogen topdressings to the summer grass in August can help maintain the protein content of the grass and to some extent can hold up forage growth rate. Supplementary irrigation at this season of the year is usually necessary if assurance of forage growth is desired. Temporary pastures such as Tift sudan grass or Starr millet are also helpful to furnish good grazing and thus hold up milk production in late summer.

Frost in early November usually stops growth of Bermuda grass, although Dallis grass withstands some frost and may maintain non-milking animals into December. In order that green grazing may be available for milking cows at the end of the summer pasture season, some land should be prepared in August and early September for seeding in mid-September to oats or other cereal along with rye grass and crimson clover. If satisfactory rains occur or supplementary irrigation is practiced, grazing can be had between October 15 and November 15. Forage growth may be at a rate of 10 to 20 pounds of dry matter per acre daily during part of October and November due to adequate temperatures, but is usually below 10 pounds per acre daily during much of December, January, and February because of prevailing cool or cold weather and low light intensity. The advent of warm weather and longer days in spring causes a very rapid growth of forage. Some supplementary barn feeding is necessary during the winter months because the forage growth rate is usually not sufficient to supply the feed necessary, unless several acres of pasture are supplied per cow.

The short, often cloudy days with low light intensity and the prevailing cool temperatures during the winter months greatly retard the rate of photosynthesis of pasture plants. Nitrogen, if in available form, continues to be

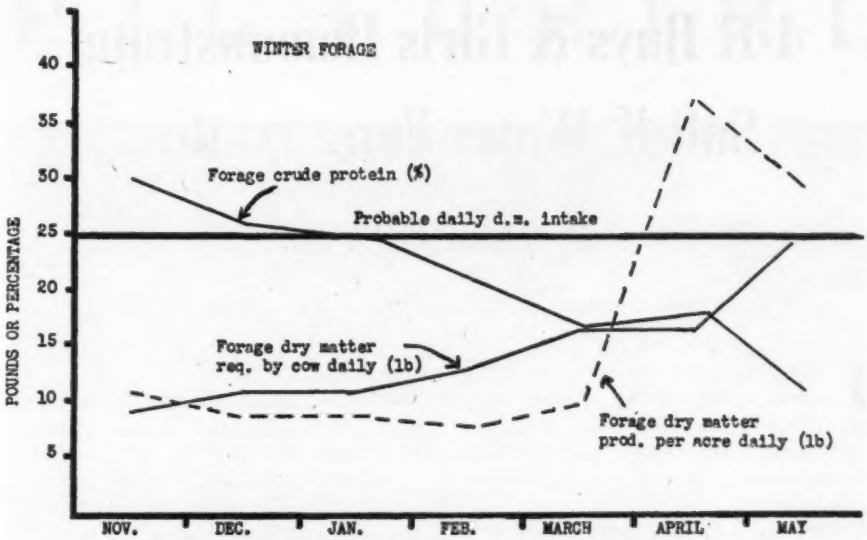

Fig. 2. Factors affecting the feeding program on winter temporary forages.

taken up by the plants at lower temperatures than is necessary for appreciable photosynthesis. This results in a high-nitrogen, low-carbohydrate forage for a period of at least four months in winter, as shown in Figure 2. Preliminary investigations at the Georgia Experiment Station have shown that roughly 40 per cent of the nitrogen in some winter forage is water soluble and apparently is mostly in amino acid form. Winter forage is thus a high-protein, low-energy feed. With the advent of warm weather and longer days in spring, however, rapid photosynthesis results in the formation of so much carbohydrate material that the protein content of the forage rapidly decreases. If this winter pasturage in spring becomes too low in protein and too high in fiber for high milk persistency, the cows should be changed to a white or ladino clover permanent pasture which should be ready for grazing at this time.

The Effects of Pasture Variation on Feeding Practices

The preceding sections of this article have described in some detail the agronomic changes that occur in typical Georgia pastures. While these changes provide an interesting phenomenon for the research worker, they are a constant source of trouble for the dairyman. Our illustrations in Figures 1 and 2 are in terms of a 1,000-pound cow producing 30 pounds of 4 per cent milk per day and this is the basis for considering the effects of pasture variation on feeding practices.

Morrison states the requirement for such a dairy animal is 2.12 pounds digestible protein and 17.6 pounds total digestible nutrients per day. During the winter months the energy requirement is undoubtedly higher, but no feeding standard in use at present takes this need into consideration. The important fact to be considered is that, within limits, the cow's daily requirement remains constant throughout the season. The problem becomes one of supplying the cow's need regardless of pasture variations Two primary factors govern the amount and type of supplementary feed that the cows must receive if near maximum production is to be maintained.

1. The nutrient deficiency of the pasture forage—protein during the dry

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4-H Boys & Girls Demonstrate Soil & Water Conservation

By J. Frank Doggett

North Carolina Agricultural Experiment Station, Raleigh, North Carolina

IT has been said "the future is in the hands of our youth." One observing the 4-H boys and girls giving soil and water conservation demonstrations would believe the future of agriculture is bright.

Last year 4-H boys and girls of North Carolina were offered a State contest in soil and water conservation demonstrations for the first time. Contestants from 18 counties competed for the State prize, a pen and pencil set furnished by Firestone Tire and Rubber Co. The originality and enthusiasm shown in the demonstrations were very inspirational. These boys and girls not only learned to recognize the basic problems of soil and water conservation, but gave thought to the practical solution of these problems. They now are prepared to be better farmers and are helping to influence adults to farm better. The demonstrations have been used very effectively at farm meetings and never fail to get and hold the attention of farmers.

Joyner Brooks of Wake County won first place, individual, with a demonstration on the correct method of taking soil samples for analysis. He used a special box 24″ x 12″ x 12″ constructed so that the end could be removed. The box was filled with soil from a field he is using for crops projects. Subsoil was in the botton and topsoil in the upper portion of the box. When the end of the box was removed, the entire soil profile was exposed. Joyner pointed out and explained the difference of these two soil layers and then proceeded to take a soil sample. A detailed explanation and illustration were given even to packaging, marking, addressing, and mailing.

Joyner then used a blackboard to illustrate how to fill in the information and cropping history sheet which must be mailed with the soil samples to the laboratory. He emphasized with his own experience the importance of using soil analysis as a guide for fertilizing crops. He had used this field for corn two years ago in a corn-growing contest and fertilized with 300 lbs. per acre of 6-8-6 (at planting). His yield was good but did not win. He plans to enter the corn contest again and will fertilize with 300 lbs. per acre of 5-10-10 because of the soil test laboratory recommendations. His soil was low in potash. He expects to make a better yield.

Clarence Chappel and Bobby Smith of Perquimans County won first place in the team demonstration contest. The title of their demonstration was "The Effectivenes of Cover in Preventing Both Wind and Water Erosion and Conserving Water." The equipment was two shallow boxes (one filled with bare soil and the other with pasture sod), 2 jars (1 qt.) of water, sprinkler can, and an electric fan.

The fan was turned first on the bare soil and then on the sod. Soil was blown from the bare soil but that under the sod was not affected. The boys discussed the erosion damage by wind

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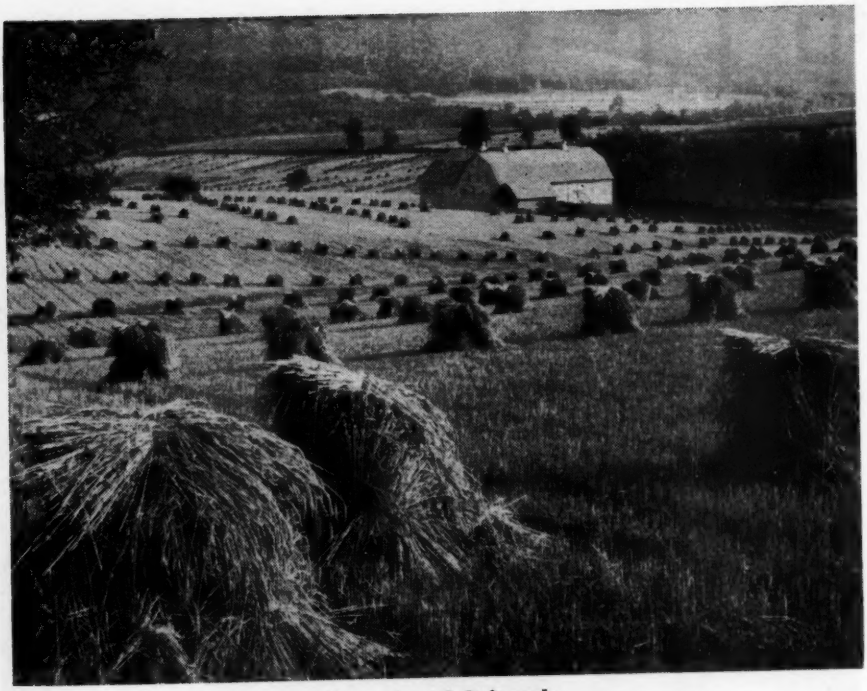
PICTORIAL

Serious Business



Above: A good day's work.

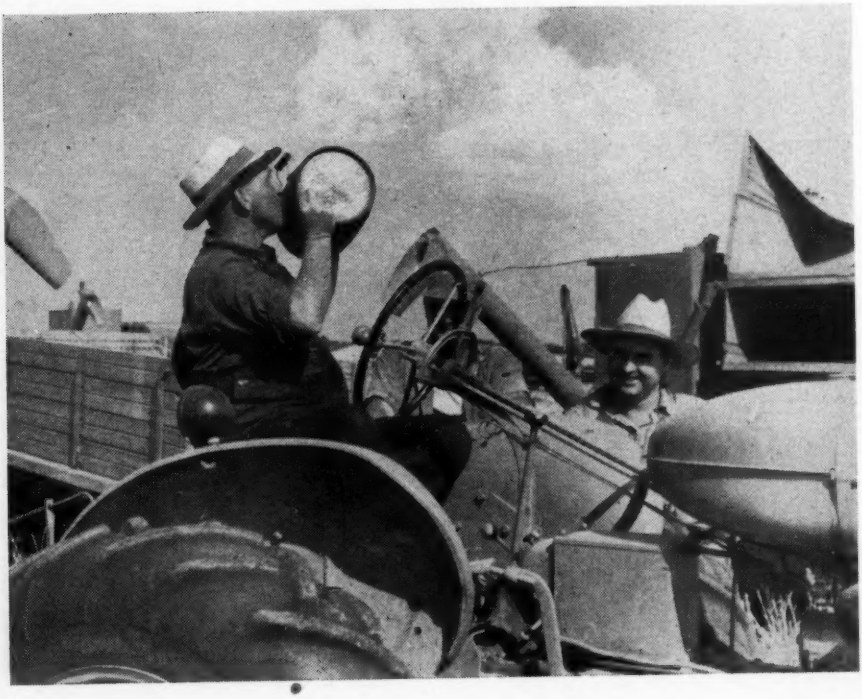
Below: After-hours chore.

Above: Following the contour.

Below: Getting the long rows.

Above: Modern stacking.

Below: Down the hatch.



The Editors Talk

Think Safety, Act Safely

Those four words are good advice for everyone. As the last half of the slogan—"Adopt right attitudes toward farm safety; think safety, act safely"—they are being widely publicized in preparations for the observance of the ninth annual National Farm Safety Week, July 20-26.

This observance, proclaimed by President Truman, is being sponsored by the National Safety Council, the U. S. Department of Agriculture, et al. The Council points out that most farm accidents involve attitudes and lists seven types of individuals who exemplify the wrong attitudes toward safety:

HURRY HARRY, who never takes time to take care. Harry doesn't realize that haste makes waste and that short cuts or failure to stop long enough to correct a hazard may result in a loss of time, money, and health.

GAMBLER JOE, who gambles with his life and happiness. He depends on luck and takes such needless chances.

JOHN SCOFFLAW, who doesn't take safety seriously. He knows the safety rules, but thinks they are meant for the other fellow.

SLOPPY SAM, who puts off until tomorrow the elimination of hazards he finds today. He never has a place for anything and everything is out of place.

HAP HAZARD, who tries to crowd everything into one day. He never plans ahead. Consequently, he always has to hurry to get done.

ARSONIC AL, who smokes around the barn, throws away matches and cigarettes before they are out, smokes in bed, and never bothers to properly label flammable liquids and poisons.

ROAD HOG CHARLIE, who, like his city pal, thinks the whole road belongs to him. He pounds his horn, yells at other drivers, and is generally obnoxious in his attitude toward highway safety.

Figures often are tiresome; but they can be startling. When it is considered that about 15,000 farm residents die and about 1,300,000 are injured in rural accidents each year, the purpose behind a farm safety week is clear. Some forty years ago, industry launched a safety program that has saved hundreds of thousands of lives. While farming does not lend itself to many of the safety devices employed by industry, more things can be done, among which probably the greatest is instilling a constant awareness of the dangers lurking in everyday farm life. The farm home probably is safest and offers the most security, and yet 4,000 farm residents are killed within the home annually from falls, burns, poisoning, etc. Another 4,000 die in outside work accidents, and motor vehicle accidents take about 6,000.

Much of the progress in educational work involving greater farm safety measures is due to the tactful suggestions of the agricultural extension forces. They recognize the urgency of State, county, and local activity to alert farm people to safeguard themselves against the hazards that remain unrecognized or disregarded—an essential and much appreciated service.

Our Cover Picture

Cotton rust is potash starvation. This was revealed in experimental work for the control of "black rust" in Alabama during the early 90's and was verified by several growers who were experimenting with the use of kainit as a fertilizer. The symptoms of the "disease" were described somewhat more technically then, but parallel what is to be found in our current literature.

The first symptom of potash starvation on cotton is a yellowish-white mottling in the leaf. The leaf color changes to light yellowish green, and yellow spots appear between the veins. Centers of these spots die and brown specks occur at the tip, around the margin, and between the veins. The tip and margin of the leaf break down first and curl downward. As the break-down progresses, the whole leaf finally becomes reddish brown in color, dries, and is shed prematurely. This premature shedding of leaves prevents the proper development of bolls, which are dwarfed and immature. Many of the bolls fail to open and the fiber is of poor quality. In our cover illustration, a normal boll and leaf appear at the left; the potash-starved at the right.

Progress in the culture of cotton over countless generations led to its becoming the greatest of all fibre crops. First mention of it was found in Hindoo religious writing more than 4,000 years ago and it was described as trees bearing bunches of wool. Introduced in America soon after the first settlements were made, it spread over the South, where it still is the principal cash crop. In the year 1790 the United States produced around 5,000 bales; in 1951, more than 15,000,000.

Not too long ago, cotton was considered about the only cash crop grown over much of the South. Agriculturists felt that this was not an economically healthy situation and advised diversification. This has resulted in other crops and livestock assuming a much more prominent position in Southern agriculture than in the past, but the value of cotton cannot be overlooked. Proper fertilization and good soil management to obtain the yields and quality which make this country by far the most important cotton-producing nation in the world are fundamental to a profitable Southern agriculture. Methods, including the observance of deficiency symptoms, for achieving these ends should be used by all growers.

Cotton rust is now controlled with adequate potash in the fertilizer at planting time or with a sidedressing with muriate of potash at chopping-out time.

Silver Anniversary

Twenty-five years of writing under a pseudonym and on restricted subject matter would not be an easy task to consider. Yet, when twenty-five years ago we approached E. R. McIntyre, then editor of the Wisconsin Farmer, to undertake the Jeff McDermid articles for this magazine, he cheerfully agreed to give them a try. He already was known for his down-to-earth thinking and easy expression of such thinking. There, therefore, was little difficulty in his attaining among our readers a following which has grown with the years until "Jeff" has become a personality involving considerable correspondence.

Mr. McIntyre now is an Information Specialist with the U. S. Department of Agriculture. In this issue he reviews his twenty-five years of writing for us in a vein characteristic of his humble philosophy. We are congratulating him, and ourselves, for his 550,000 words and are hoping that we shall have another such total from the same "Jeff" to present to our readers in the years to come.

Season Average Prices Received by Farmers for Specified Commodities *

Crop Year	Cotton Cents per lb. Aug.-July	Tobacco Cents per lb.	Potatoes Cents per bu. July-June	Sweet Potatoes Cents per bu. July-June	Corn Cents per bu. Oct.-Sept.	Wheat Cents per bu. July-June	Hay [1] Dollars per ton July-June	Cottonseed Dollars per ton July-June	Truck Crops ....
Av. Aug. 1909–July 1914....	12.4	10.0	69.7	87.8	64.2	88.4	11.87	22.55	....
1926.....	12.5	17.9	131.4	117.4	74.5	121.7	13.24	22.04	....
1927.....	20.2	20.7	101.9	109.0	85.0	119.0	10.29	34.83	....
1928.....	18.0	20.0	53.2	118.0	84.0	99.8	11.22	34.17	....
1929.....	16.8	18.3	131.6	117.1	79.9	103.6	10.90	30.92	....
1930.....	9.5	12.8	91.2	108.1	59.8	67.1	11.06	22.04	....
1931.....	5.7	8.2	46.0	72.6	32.0	39.0	8.69	8.97	....
1932.....	6.5	10.5	38.0	54.2	31.9	38.2	6.20	10.33	....
1933.....	10.2	13.0	82.4	69.4	52.2	74.4	8.09	12.88	....
1934.....	12.4	21.3	44.6	79.8	81.5	84.8	13.20	33.00	....
1935.....	11.1	18.4	59.3	70.3	65.5	83.2	7.52	30.54	....
1936.....	12.4	23.6	114.2	92.9	104.4	102.5	11.20	33.36	....
1937.....	8.4	20.4	52.9	78.0	51.8	96.2	8.74	19.51	....
1938.....	8.6	19.6	55.7	69.8	48.6	56.2	6.78	21.79	....
1939.....	9.1	15.4	69.7	73.4	56.8	69.1	7.94	21.17	....
1940.....	9.9	16.0	54.1	85.4	61.8	68.2	7.59	21.73	....
1941.....	17.0	26.4	80.8	92.2	75.1	94.4	9.70	47.65	....
1942.....	19.0	36.9	117.0	118.0	91.7	110.0	10.80	45.61	....
1943.....	19.9	40.5	131.0	206.0	112.0	136.0	14.80	52.10	....
1944.....	20.7	42.0	150.0	190.0	109.0	141.0	16.50	52.70	....
1945.....	22.5	36.6	143.0	204.0	127.0	150.0	15.10	51.10	....
1946.....	32.6	38.2	124.0	218.0	156.0	191.0	16.70	72.00	....
1947.....	31.9	38.0	162.0	217.0	216.0	229.0	17.60	85.90	....
1948.....	30.4	48.2	155.0	222.0	129.0	200.0	18.45	67.20	....
1949.....	28.6	45.9	128.0	214.0	124.0	188.0	16.50	43.40	....
1950.....	40.1	51.6	91.6	173.0	153.0	200.0	16.70	86.50	....
1951									
June.....	42.02	49.0	108.0	210.0	162.0	208.0	16.85	95.60	....
July.....	39.11	49.5	118.0	219.0	163.0	205.0	15.45	78.00	....
August.....	34.60	47.7	117.0	273.0	165.0	205.0	15.65	69.10	....
September...	33.73	52.4	123.0	287.0	165.0	207.0	16.55	66.10	....
October.....	36.21	57.7	139.0	271.0	164.0	210.0	17.15	69.90	....
November....	41.00	50.0	174.0	280.0	162.0	219.0	18.35	72.70	....
December....	40.34	51.0	193.0	305.0	169.0	222.0	19.65	71.50	....
1952									
January.....	38.70	46.2	207.0	347.0	168.0	220.0	20.75	70.10	....
February....	37.25	33.8	205.0	357.0	166.0	218.0	20.65	67.10	....
March.....	36.72	23.5	216.0	383.0	165.0	220.0	20.35	61.50	....
April.....	37.30	15.0	231.0	416.0	168.0	218.0	20.05	60.80	....
May.....	36.08	43.5	264.0	433.0	170.0	213.0	18.65	60.80	....
Index Numbers (Aug. 1909—July 1914 = 100)									
1926.....	101	179	189	134	116	138	112	98	139
1927.....	163	207	146	124	132	135	87	154	127
1928.....	145	200	76	134	131	113	95	152	154
1929.....	135	183	189	133	124	117	92	137	137
1930.....	77	128	131	123	93	76	93	93	129
1931.....	46	82	66	83	50	44	73	40	115
1932.....	52	105	55	62	50	43	52	46	102
1933.....	82	130	118	79	81	84	68	57	91
1934.....	100	213	64	91	127	96	111	146	95
1935.....	90	184	85	80	102	94	63	135	119
1936.....	100	236	164	106	163	116	94	148	104
1937.....	68	204	76	89	81	109	74	87	110
1938.....	69	196	80	79	76	64	57	97	88
1939.....	73	154	100	84	88	78	67	94	91
1940.....	80	160	78	97	96	77	64	96	111
1941.....	137	264	116	105	117	107	82	211	129
1942.....	153	369	168	134	143	124	91	202	163
1943.....	160	405	188	235	174	154	125	231	245
1944.....	167	420	214	216	170	160	139	234	212
1945.....	181	366	205	232	198	170	127	227	207
1946.....	263	382	178	248	212	209	141	319	182
1947.....	257	380	232	248	336	259	148	381	226
1948	245	482	222	253	201	226	155	298	214
1949.....	231	459	184	244	193	213	139	192	201
1950.....	323	516	131	197	238	226	141	384	185
1951									
June.....	339	490	155	239	252	235	142	424	189
July.....	315	495	169	249	254	232	130	346	204
August.....	279	477	168	311	257	232	132	306	181
September...	272	524	176	327	257	234	139	293	161
October.....	292	577	188	309	255	238	144	310	171
November...	331	500	250	319	252	248	155	322	249
December....	325	510	277	347	263	251	166	317	331
1952									
January.....	312	462	297	395	262	249	175	311	337
February.....	300	338	294	407	259	247	174	298	217
March.....	296	235	310	436	257	249	171	273	265
April.....	301	150	331	474	262	247	169	270	308
May.....	291	435	379	493	265	240	157	270	285

Wholesale Prices of Ammoniates

	Nitrate of soda bulk per unit N	Sulphate of ammonia bulk per unit N	Cottonseed meal S. E. Mills per unit N	Fish scrap, dried 11–12% ammonia, 15% bone phosphate, f.o.b. factory bulk per unit N	Tankage 11% ammonia, 15% bone phosphate, f.o.b. Chicago, bulk, per unit N	High grade ground blood, 16–17% ammonia, Chicago, bulk, per unit N
1910–14	$2.68	$2.85	$3.50	$3.53	$3.37	$3.52
1926	3.06	2.41	4.40	4.95	4.36	4.90
1927	3.01	2.26	5.07	5.87	4.32	5.70
1928	2.67	2.30	7.06	6.63	4.92	6.00
1929	2.57	2.04	5.64	5.00	4.61	5.72
1930	2.47	1.81	4.78	4.96	3.79	4.58
1931	2.34	1.46	3.10	3.95	2.11	2.46
1932	1.87	1.04	2.18	2.18	1.21	1.36
1933	1.52	1.12	2.95	2.86	2.06	2.46
1934	1.52	1.20	4.46	3.15	2.67	3.27
1935	1.47	1.15	4.59	3.10	3.06	3.65
1936	1.53	1.23	4.17	3.42	3.58	4.25
1937	1.63	1.32	4.91	4.66	4.04	4.80
1938	1.69	1.38	3.69	3.76	3.15	3.53
1939	1.69	1.35	4.02	4.41	3.87	3.90
1940	1.69	1.36	4.64	4.36	3.33	3.39
1941	1.69	1.41	5.50	5.32	3.76	4.43
1942	1.74	1.41	6.11	5.77	5.04	6.76
1943	1.75	1.42	6.30	5.77	4.86	6.62
1944	1.75	1.42	7.68	5.77	4.86	6.71
1945	1.75	1.42	7.81	5.77	4.86	6.71
1946	1.97	1.44	11.04	7.38	6.60	9.33
1947	2.50	1.60	12.72	10.66	12.63	10.46
1948	2.86	2.03	12.94	10.59	10.84	9.85
1949	3.15	2.29	10.11	13.18	10.73	10.62
1950	3.00	1.95	11.01	11.70	10.21	9.36
1951						
June	3.13	1.88	13.53	9.98	8.87	8.50
July	3.13	2.03	12.37	10.06	8.68	8.56
August	3.13	2.07	11.94	10.41	8.66	8.66
September	3.13	2.07	11.50	10.78	9.26	9.26
October	3.13	2.07	12.85	11.28	10.56	10.32
November	3.34	2.07	13.93	11.28	10.39	10.25
December	3.34	2.07	14.27	11.28	10.08	10.02
1952						
January	3.34	2.07	14.27	11.28	10.39	12.16
February	3.34	2.07	14.27	11.28	11.61	11.08
March	3.34	2.07	14.26	11.28	9.71	9.04
April	3.34	2.07	14.26	11.28	8.80	8.05
May	3.34	2.07	14.25	11.28	7.75	7.36
	Index Numbers (1910-14 = 100)					
1926	113	84	126	140	129	139
1927	112	79	145	166	128	162
1928	100	81	202	188	146	170
1929	96	72	161	142	137	162
1930	92	64	137	141	112	130
1931	88	51	89	112	63	70
1932	71	36	62	62	36	39
1933	59	39	84	81	97	71
1934	59	42	127	89	79	93
1935	57	40	131	88	91	104
1936	59	43	119	97	106	131
1937	61	46	140	132	120	122
1938	63	48	105	106	93	100
1939	63	47	115	125	115	111
1940	63	48	133	124	99	96
1941	63	49	157	151	112	126
1942	65	49	175	163	150	192
1943	65	50	180	163	144	189
1944	65	50	219	163	144	191
1945	65	50	223	163	144	191
1946	74	51	315	209	196	265
1947	93	56	363	302	374	297
1948	107	71	370	300	322	280
1949	117	80	289	373	318	302
1950	112	68	315	331	303	266
1951						
June	117	66	387	283	263	241
July	117	71	353	285	258	243
August	117	73	341	295	257	246
September	117	73	329	305	275	263
October	117	73	365	320	313	293
November	125	73	398	320	308	291
December	125	73	408	320	299	285
1952						
January	122	73	408	320	308	345
February	125	73	408	320	344	315
March	125	73	407	320	288	257
April	125	73	407	320	261	229
May	125	73	407	320	230	209

Wholesale Prices of Phosphates and Potash * *

	Superphosphate, Baltimore, per unit	Florida land pebble, 68% f.o.b. mines, bulk, per ton	Tennessee phosphate rock, 75% f.o.b. mines, bulk, per ton	Muriate of potash bulk, per unit, c.i.f. Atlantic and Gulf ports[2]	Sulphate of potash in bags, per unit, c.i.f. Atlantic and Gulf ports[2]	Sulphate of potash magnesia, per ton, c.i.f. Atlantic and Gulf ports[2]	Manure salts bulk, per unit, c.i.f. Atlantic and Gulf ports[2]
1910–14	$0.536	$3.61	$4.88	$0.714	$0.953	$24.18	$0.657
1926	.598	3.20	5.57	.596	.854	23.58	.537
1927	.525	3.09	5.50	.646	.924	25.55	.586
1928	.580	3.12	5.50	.669	.957	26.46	.607
1929	.609	3.18	5.50	.672	.962	26.59	.610
1930	.542	3.18	5.50	.681	.973	26.92	.618
1931	.485	3.18	5.50	.681	.973	26.92	.618
1932	.458	3.18	5.50	.681	.963	26.90	.618
1933	.434	3.11	5.50	.662	.864	25.10	.601
1934	.487	3.14	5.67	.486	.751	22.49	.483
1935	.492	3.30	5.69	.415	.684	21.44	.444
1936	.476	1.85	5.50	.464	.708	22.94	.505
1937	.510	1.85	5.50	.508	.757	24.70	.556
1938	.492	1.85	5.50	.523	.774	15.17	.572
1939	.478	1.90	5.50	.521	.751	24.52	.570
1940	.516	1.90	5.50	.517	.730	24.75	.573
1941	.547	1.94	5.64	.522	.780	25.55	.367
1942	.600	2.13	6.29	.522	.810	25.74	.205
1943	.631	2.00	5.93	.522	.786	25.35	.195
1944	.645	2.10	6.10	.522	.777	25.35	.195
1945	.650	2.20	6.23	.522	.777	25.35	.195
1946	.671	2.41	6.50	.508	.769	24.70	.190
1947	.746	3.05	6.60	.432	.706	18.93	.195
1948	.764	4.27	6.60	.397	.681	14.14	.195
1949	.770	3.88	6.22	.397	.703	14.14	.195
1950	.763	3.83	5.47	.371	.716	14.33	.195
1951							
June	.810	3.98	5.47	.355	.708	13.44	.176
July	.810	3.98	5.47	.389	.768	14.72	.193
August	.810	3.98	5.47	.389	.768	14.72	.193
September	.810	3.98	5.47	.386	.768	14.72	.193
October	.820	3.98	5.47	.386	.768	14.72	.193
November	.820	3.98	5.47	.386	.768	14.72	.193
December	.820	3.98	5.47	.420	.827	16.00	.210
1952							
January	.820	3.98	5.47	.420	.827	16.00	.210
February	.820	3.98	5.47	.420	.827	16.00	.210
March	.832	3.98	5.47	.420	.827	16.00	.210
April	.840	3.98	5.47	.420	.827	16.00	.210
May	.860	3.98	5.47	.420	.827	16.00	.210
			Index Numbers (1910-14 = 100)				
1926	112	88	114	83	90	98	82
1927	100	86	113	90	97	106	89
1928	108	86	113	94	100	109	92
1929	114	88	113	94	101	110	93
1930	101	88	113	95	102	111	94
1931	90	88	113	95	102	111	94
1932	85	88	113	95	101	111	94
1933	81	86	113	93	91	104	91
1934	91	87	110	68	79	93	74
1935	92	91	117	58	72	89	68
1936	89	51	113	65	74	95	77
1937	95	51	113	71	79	102	85
1938	92	51	113	73	81	104	87
1939	89	53	113	73	79	101	87
1940	96	53	113	72	77	102	87
1941	102	54	110	73	82	106	87
1942	112	59	129	73	85	106	84
1943	117	55	121	73	82	105	83
1944	120	58	125	73	82	105	83
1945	121	61	128	73	82	105	83
1946	125	67	133	71	81	102	82
1947	139	84	135	70	74	78	83
1948	143	118	135	67	72	58	83
1949	144	108	128	67	74	58	83
1950	142	106	112	68	75	59	83
1951							
June	151	110	112	65	74	56	80
July	151	110	112	70	81	61	82
August	151	110	112	70	81	61	82
September	151	110	112	70	81	61	82
October	153	110	112	70	81	61	82
November	153	110	112	70	81	61	82
December	153	110	112	75	87	66	85
1952							
January	153	110	112	75	87	66	85
February	153	110	112	75	87	66	85
March	155	110	112	75	87	66	85
April	157	110	112	75	87	66	85
May	160	110	112	75	87	66	85

Combined Index Numbers of Prices of Fertilizer Materials, Farm Products and All Commodities

	Farm prices*	Prices paid by farmers for commodities bought*	Wholesale prices of all commodities†	Fertilizer material‡	Chemical ammoniates	Organic ammoniates	Superphosphate	Potash**
1926.....	146	150	146	119	94	135	112	86
1927.....	141	148	139	116	89	150	100	94
1928.....	149	152	141	121	87	177	108	97
1929.....	148	150	139	114	79	146	114	97
1930.....	125	140	126	105	72	131	101	99
1931.....	87	119	107	83	62	83	90	99
1932.....	65	102	95	71	46	48	85	99
1933.....	70	104	96	70	45	71	81	95
1934.....	90	118	109	72	47	90	91	72
1935.....	109	123	117	70	45	97	92	63
1936.....	114	123	118	73	47	107	89	69
1937.....	122	130	126	81	50	129	95	75
1938.....	97	122	115	78	52	101	92	77
1939.....	95	121	112	79	51	119	89	77
1940.....	100	122	115	80	52	114	96	77
1941.....	123	130	127	86	56	130	102	77
1942.....	158	149	144	93	57	161	112	77
1943.....	192	165	151	94	57	160	117	77
1944.....	196	174	152	96	57	174	120	76
1945.....	206	180	154	97	57	175	121	76
1946.....	234	197	177	107	62	240	125	75
1947.....	275	231	222	130	74	362	139	72
1948.....	285	250	241	134	89	314	143	70
1949.....	249	240	226	137	99	319	144	70
1950.....	256	246	236	132	89	314	142	72
1951								
June.....	301	272	265	134	91	311	151	69
July.....	294	271	261	135	93	297	151	74
August....	292	271	258	135	94	294	151	74
September.	291	271	258	135	94	300	151	73
October...	296	272	259	140	94	335	153	73
November.	301	274	259	143	98	343	153	73
December..	305	273	258	144	98	342	153	78
1952								
January...	300	275	258	144	98	347	153	78
February..	289	278	255	146	98	365	153	78
March....	288	277	251	144	98	336	155	78
April.....	290	277	251	142	98	322	157	78
May.....	293	277	252	142	98	306	160	78

* U. S. D. A. figures, revised January 1950. Beginning January 1946 farm prices and index numbers of specific farm products revised from a calendar year to a crop-year basis. Truck crops index adjusted to the 1924 level of the all-commodity index.

† Department of Labor index converted to 1910-14 base.

‡ The Index numbers of prices of fertilizer materials are based on original study made by the Department of Agricultural Economics and Farm Management, Cornell University, Ithaca, New York. These indexes are complete since 1897. The series was revised and reweighted as of March 1940 and November 1942.

[1] Beginning July 1949, baled hay prices reduced by $4.75 a ton to be comparable to loose hay prices previously quoted.

[2] All potash salts now quoted F.O.B. mines only; manure salts since June 1941, other carriers since June 1947.

** The weighted average of prices actually paid for potash is lower than the annual average because since 1926 over 90% of the potash used in agriculture has been contracted for during the discount period. The maximum discount is now 16%. Applied to muriate of potash, a price slightly above $.353 per unit K_2O thus more nearly approximates the annual average than do prices based on arithmetical averages of monthly quotations.

REVIEWS

This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture, the State Experiment Stations, and Canada, relating to Fertilizers, Soils, Crops, and Economics. A file of this department of BETTER CROPS WITH PLANT FOOD would provide a complete index covering all publications from these sources on the particular subjects named.

Fertilizers

"Fourteenth Annual Report of the Arizona Fertilizer Control Office, Fertilizers and Agricultural Minerals, Year Ending December 31, 1951," Agr. Exp. Sta., Univ. of Ariz., Tucson, Ariz., Spec. Bul., Feb. 1952.

"Nitrogen for Illinois Corn," Agr. Exp. Sta., Univ. of Ill., Urbana, Ill., AG 1481, Feb. 5, 1951, L. B. Miller.

"Anhydrous Ammonia and Its Use in Illinois," Agr. Exp. Sta., Univ. of Ill., Urbana, Ill., AG 1484, Feb. 1951, A. L. Lang.

"Meeting the Nitrogen Problems on Illinois Soils," Agr. Exp. Sta., Univ. of Ill., Urbana, Ill., AG 1489, Apr. 1951.

"Comparative Effects of Soils, Fertilizers and Systems of Soil Treatment on Crop Yields," Agr. Exp. Sta., Univ. of Ill., Urbana, Ill., AG 1512, Aug. 1951, F. C. Bauer and J. H. Griffin.

"Commercial Fertilizers, 1951—Official Inspections 221," Agr. Exp. Sta., Univ. of Me., Orono, Me., Oct. 1951, E. R. Tobey.

"Fertilizer and Production Practices for Corn in the Hill Sections of Mississippi," Agr. Exp. Sta., Miss. State College, State College, Miss., Bul. 486, Dec. 1951, H. V. Jordan.

"Inspection of Commercial Fertilizers Made for the State Department of Agriculture," Agr. Exp. Sta., Univ. of N. H., Durham, N. H., Bul. 391, Sept. 1951, H. A. Davis, M. A. Bruce, and E. E. Eastman.

"Twenty-second Annual Report of the New Mexico Feed and Fertilizer Control Office Year Ending December 31, 1951—Commercial Fertilizers," N. Mex. Feed and Fert. Control Office, State College, N. Mex., R. W. Ludwick and L. T. Elliott.

"Ohio Fertilizer Recommendations for 1952," Ext. Serv., Ohio State Univ., Columbus, Ohio, Ext. Bul. 329, Feb. 1952, E. Jones and G. W. Volk.

"Inspection and Analysis of Commercial Fertilizers," Agr. Exp. Sta., Clemson College, Clemson, S. C., Bul. 397, Nov. 1951, B. D. Cloaninger.

"Corn Fertility Studies at the Blackland Station, 1949-51," Agr. Exp. Sta., Tex. A & M College, College Station, Tex., P. R. 1418, Nov. 28, 1951, J. W. Collier.

"Anhydrous Ammonia as a Nitrogenous Fertilizer for Rice in Texas," Agr. Exp. Sta., Tex. A & M College, College Station, Tex., P. R. 1424, Dec. 22, 1951, R. H. Wyche, R. L. Cheaney, and J. B. Moncrief.

"Little Leaf or Zinc Deficiency of Concord Grapes," Irrigation Exp. Sta., Prosser, Wash., Sta. Cir. No. 136, Mar. 1951, W. J. Clore.

Soils

"The Salinity Problem—Safford Experiment Farm Field Experiments," Agr. Exp. Sta., Univ. of Ariz., Tucson, Ariz., Tech. Bul. No. 124, Feb. 1952, W. T. McGeorge, E. L. Breazeale, and A. M. Bliss.

"The Salinity Problem—Safford Experiment Farm Laboratory Studies," Univ. of Ariz., Tucson, Ariz., Tech. Bul. No. 125, Feb. 1952, W. T. McGeorge.

"Lime and Other Soil Amendments," Can. Dept. of Agr., Ottawa, Ont., Can., Pub. 869, Mar. 1952.

"Reclaiming Illinois Strip Coal Lands by Forest Planting," Agr. Exp. Sta., Univ. of Ill., Urbana, Ill., Bul. 547, Nov. 1951, G. A. Limstrom and G. H. Deitschman.

"Policy of the University of Illinois Soil Testing Laboratory for Training Technicians and Testing Check Samples for County and Commercial Soil Testing Laboratories," Soil Testing Lab., Univ. of Ill., Urbana, Ill., AG 1510, Sept. 1951.

"Is Conservation Education Worth While?" Ext. Serv., Univ. of Ill., Urbana, Ill., AG 1515, Oct. 1951, W. D. Masters.

"Limestone Requirements of Illinois Counties—1950," Soil Testing Lab., Univ. of Ill., Urbana, Ill., AG 1525, Dec. 26, 1951, A. U. Thor and W. J. Armon.

"Fertility Levels of Missouri Soils," Agr. Exp. Sta., Univ. of Mo., Columbia, Mo., Bul. 552, May 1951, E. R. Graham and V. L. Sheldon.

"A Method for Rating Land," Agr. Exp. Sta., N. Mex. A & M College, State College, N. Mex., Bul. 364, Sept. 1951, W. M. LeVee and H. E. Dregne.

"Soils of Jerauld County South Dakota," Agr. Exp. Sta., S. D. State College, Brookings, S. D., Bul. 411, June 1951, A. J. Klingelhoets, V. W. Moxon, G. B. Lee, and G. J. Buntley.

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"Papa," said the young son, "What is the difference between a Statesman and politician?"

"A Statesman, my son, wants to do something for his country. A politician wants his country to do something for him."

When a stranger emerged from the subway to ask which way was north, a New Yorker replied:

"Uptown we got, downtown and crosstown we got—and now this guy wants to know which way's north!"

Plant Geography

"THE World Was My Garden" was the title Dr. David Fairchild chose for the reminiscent record of his far-ranging travels as a plant explorer for the U. S. Department of Agriculture. After his retirement the plant-introduction activities of the Department expanded further and needs for new characters—such as resistance to diseases, insects or adverse conditions—increased the demand for such work. The modern plant explorer is likely to be a specialist on one crop or group of plants and goes to the far places with exact knowledge of what he needs to find.

But for the United States, the world is still our garden. Lima bean improvement offers an example of the world-wide scope of modern breeding methods. Plant scientists are trying to breed into the lima bean the quality of resistance to the downy mildew disease, a fungus infection that cuts yields. For this work they have assembled 113 foreign and domestic strains and varieties of lima beans. In the greenhouses and test plots at the Beltsville Research Center they have planted these beans and then doused them with mildew spores. This has disclosed four lines that are highly resistant to the fungus.

Plant-introduction records trace the sources of these lines. Their geographical origins are widely separated. One comes from California in the far Southwest; a second from our Southeast. A third is from India; the fourth from Guatemala. World trails meet and cross at Beltsville on their way to our gardens.

4-H Boys & Girls Demonstrate . . .

(*From page* 22)

on the bare land in eastern North Carolina.

One quart of clear water was then poured on each flat with a sprinkler to simulate rain. The run-off water was caught in the quart jar. Almost all of the water ran off the bare soil and considerable soil was carried with it. Very little water ran off the sod and it was almost clear. Good cover crops not only prevent erosion by both wind and water but save water to maintain ground water storage. This is important in maintaining well and stream flow.

In another good team demonstration Bill Perryman and David Patterson of Forsyth County showed the effectiveness of contour tillage and good land use. Contour tillage was illustrated by a common corrugated washboard. First, water was poured over the slanted board with the corrugations horizontal. Water ran off the board slowly. Next, water was poured over the slanted board with the corrugations vertical. Water ran from the board very rapidly with nothing to hold it back. In the first case the corrugations represented rows on the contour across the slope and in the second case, rows running with the slope.

The boys then poured water over a box of soil taken from a gently sloping, moderately eroded field. Most of the water was absorbed in the good sandy loam topsoil. It ran off a similar box of soil taken from a steep, severely eroded field. Considerable soil was removed with the run-off water.

It was explained that terracing, contour tillage, and a good rotation could be expected to give adequate erosion protection on the gently sloping land with good topsoil, but cultivation on

steep eroded land will produce excessive soil loss. A perennial sod crop is the best use for such land.

To illustrate this, one of the boys stated that the soil from the steep eroded field came from his farm. Permanent pasture has been established on part of this field. A box of pasture sod from this field was exhibited. Water was poured on the sod. Very little ran off and practically no soil was lost. Good grass-legume pastures may be grown on such land if lime, phosphate, and potash are applied in adequate amounts. Bill Perryman stated that this field was producing more feed at less cost in pasture than in grain.

"Bud" Cardwell of Rockingham County demonstrated the part that raindrops play in causing erosion. "Bud" exhibited two stakes, 3 feet long, painted white. One of the stakes was driven into a cornfield and the other into a pasture during a hard rain. Muddy splashes were thick almost to the top of the stake in the relatively bare cornfield. No splashes were on the stake in the pasture.

Two quart jars of mud and water were shown. "Bud" stated that the jars were buried with the mouth flush with the surface, one in each of the above fields near the stakes. The jars were filled with run-off water during the rain. The jar from the cornfield was almost full of mud, while the jar from the pasture contained very little soil and the water was almost clear. (See Fig. 1)

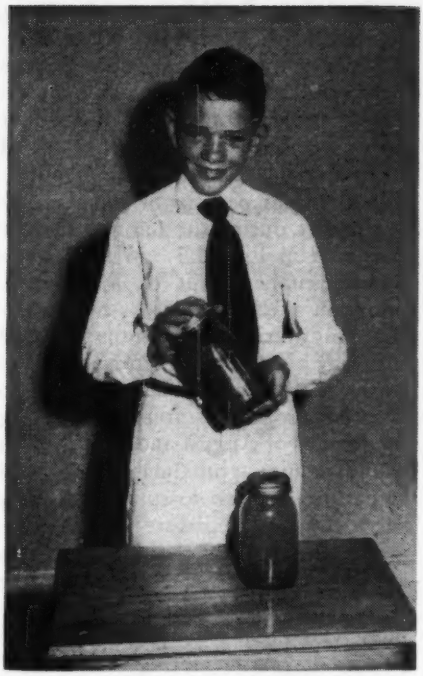

Fig. 1. "Bud" Cardwell of Rockingham County, North Carolina, holding a jar almost full of soil collected from the run-off of a clean-cultivated field. The jar on the table was collected from run-off in a pasture; note the small amount of soil and comparatively clear water.

"Bud" stated that it is estimated more than 100 tons of soil are splashed into the air in a hard rainstorm. These fine particles are torn from the mass of soil by the impact of raindrops. Once loosened they are free to be carried away by run-off water. Cover the soil to prevent raindrops striking directly and erosion is controlled.

Science and the Cow . . .

(*From page* 21)

summer months, energy during lush growing periods and the winter months in particular.

2. The amount of forage available for the cow and the extent to which she consumes and digests the forage.

The extent of the nutrient deficiencies as related to protein and energy are readily seen in Figures 1 and 2. Permanent summer pasture under Georgia conditions contains enough protein for the cow to supply her needs during the

months of April, May, and June, but a decided deficiency exists for the remainder of the summer pasture season. Typical winter forages provide an excess of protein throughout the winter period but have a decided shortage of energy-producing nutrients.

Item two is perhaps of even greater importance during the summer months as shown in Figure 1. With a cow's probable upper limit of forage consumption at 25 pounds dry matter per day, only during the months of April and May can the cow be reasonably expected to consume sufficient forage to meet her protein requirement. During the months of August and September it would require approximately two acres of pasture per cow to supply her daily needs from daily pasture growth. Research at this Station indicates that a further difficulty may come from the high temperatures during the late summer. Cows that will consume up to 28 pounds dry matter during cool weather frequently consume as little as 15 pounds during hot days.

Dairymen are required to supply the cow with the nutrients not supplied by the forage if optimum production is to be achieved. They have the choice of feeding extra barn feed or using temporary pastures During winter months extra pasture would be of little value since the need is for energy-producing feeds and the deficiency is apparently best overcome by use of good hay and extra amounts of low-protein grain rations. It should be pointed out that cows on abundant winter forage of high quality, such as that furnished by oats, rye grass, and crimson clover, frequently consume forage dry matter in excess of 25 pounds per day. This high consumption of forage frequently results in difficulty in getting the cows to consume sufficient amounts and the proper supplementary feeds in the barn.

High forage consumption tends to accentuate the already overabundance of protein in the ration, and best dairy management practices may demand that the cows be limited in their forage intake by controlled grazing. Such limitation of the grazing time to insure the consumption of proper supplementary barn feed will permit more efficient utilization of the available pasture forage and result in higher milk production by the cow since she will have a more nearly balanced ration. Obviously, such a procedure will also increase the carrying capacity of the pasture. Finally, it should be understood that on even the best pastures, high-producing dairy cows will seldom be able to consume sufficient quantities of forage to meet all their requirements and the feeding of hay and grain supplements is necessary if the level of milk production is to be maintained for a normal lactation.

Four Years of Fertilizing Oats . . .

(*From page* 14)

common nutrients should not be generally recommended for oat production in Minnesota, since many of the soils are seriously deficient in available supplies of two or more nutrients. Although a deficiency of available nitrogen usually is most limiting for oat production, supplies of available phosphate and potash are often very low on many farm soils where no consistent fertilization policy has yet been adopted.

Since oats are probably the most commonly used companion crop for hay seedings in the State, the use of nitrogen-phosphate or nitrogen-phosphate-potash combinations is to be strongly recommended in comparison to the application of any one of the

three nutrients alone. The use of a properly balanced fertilizer combination will insure maximum returns of both oats and of the following crops of hay. Nitrogen fertilizer alone often increases oat yields but seriously reduces both the stand and the quality of the succeeding legume hay crop, whereas phosphate or phosphate-potash applications often have little effect on oat yield but substantially benefit the following hay crop.

A study of the fertilizer results of the four years reveals that in unfavorable seasons the heavier applications of complete fertilizers have failed to pay their way if values are based on the value of the increase in the oat crop alone. A continuing study of the following hay crops on these fields has shown substantial increases in both hay yield and quality for more than two years after the original oat crop was fertilized. As a long-term investment, the use of complete fertilizer on a seeded-down oat crop would appear to be the most profitable.

During the course of this study, the author had an excellent opportunity to study the attitude of farmers toward the use of commercial fertilizer on small grains and the results which were obtained. The more progressive farmers following the better soil-management practices were using commercial fertilizer at every justifiable opportunity. The high fertility level which they maintained assured them of a comparatively high income. Their operating cost per acre was high, but the net return per unit was also high. Maintaining soil at high fertility level was their best insurance for continued high production. They considered the money spent for fertilizer as an investment in their soil bank to be charged off as operating cost. Fertilizer experiments on such farms are often disappointing to the investigator, since minimum yield increases are usually obtained.

On the other hand, many of the cooperating farmers felt that they were financially unable to maintain soil-management practices involving consistent fertilizer usage. The fertility of these farmer's fields was at a comparatively low level, and the response of oats to commercial fertilizer treatment was usually both tremendous and gratifying. Poor soil management on these farms resulted in a continuously low net income, with the operator feeling he could get by without commercial fertilizer "for just one more year." The

TABLE V.—THE EFFECT OF FERTILIZING OATS IN MINNESOTA—1951, 3 FIELDS WITH FOUR TREATMENT REPLICATES

Nutrients applied N P_2O_5 K_2O pounds per acre	Bushels per acre		Average
	Minimum	Maximum	
Yields on unfertilized soil			
0- 0- 0	19.1	50.2	33.9
Yield increase produced by fertilizer			
10- 0- 0	6.0	7.0	6.7*
20- 0- 0	7.1	12.9	10.6**
40- 0- 0	7.8	25.2	19.6**
0-40- 0	−2.1	3.3	0.4
0- 0-40	−2.8	1.8	−0.1
0-40-40	−8.0	4.6	−1.7
10-40- 0	2.5	6.2	4.7
20-40- 0	1.1	15.2	8.6*
40-40- 0	10.1	27.8	21.8**
10-40-40	0.5	10.5	5.5
20-40-40	11.6	14.1	12.5**
20-40-20	7.5	12.9	11.0**
40-40-40	21.4	30.6	25.2**

* Significant 6.5 bu.
** Highly sig. 8.8 bu.

Growing season weather

Month	% of normal rainfall	Deviation from normal mean temperature
April	94	−4.1° F.
May	106	+3.3° F.
June	139	−3.8° F.
July	123	−1.9° F.

operating cost per acre of such farms is low, but the net return per unit is even lower.

In conclusion, the good farm manager can justify consistent use of fertilizer as a long-time investment in soil fertility and productivity. The less successful farmer can justify fertilizer consumption on both the short and on the long-term basis. Weather conditions during each growing season will materially affect the net return in any one year, but the farmer using good soil management is in a position to show much more profit when normal growing conditions prevail.

Productive Soils . . .

(*From page* 18)

cant combination of soil characteristics in an area. Research data showing the productive capacities of different soils in the various uses are limited. But the studies which have been made along with observations show that general fertilizer and other recommendations are best for a certain range of soils and not best for other soils. The most productive soils can generally use more fertilizers efficiently than the less productive soils.

This does not mean that less fertilizer should be used on the farm land. It means that each pound of plant nutrients applied to crops will produce more efficiently, and some soils can use larger applications than we have ever applied. Fertilizers applied according to the capacities of the soils to use plant nutrients would actually result in increased amounts used on the farms.

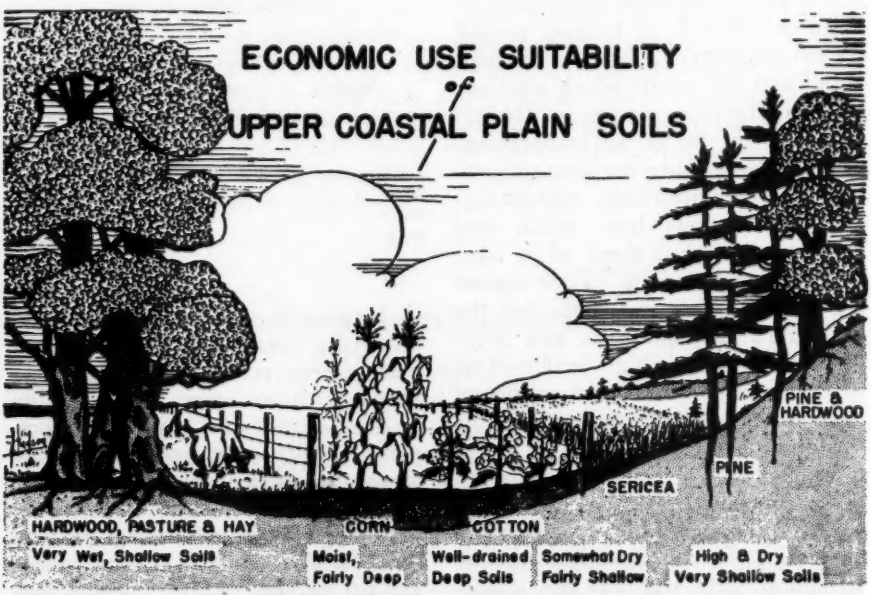

Fig. 3. The nature of the soils governs the use which is most desirable for each field and the capacity of the land to produce high yields. Soil conditions should be considered carefully before crop rotations are recommended. (Courtesy of Dr. O. T. Osgood)

Better Potato Yields . . .

(*From page* 9)

clover. Five hundred pounds of a 6-12-24 fertilizer would accomplish this purpose.

In this system the first clover crop is removed for hay and the second crop is either combined for seed or plowed under for a green manure. For any system to succeed it is necessary to show some profit on the investment. Table V gives this information for oats and clover.

The rotation with the system of fertilizer application presented here has the following features:

1. It supplies desirable nutrients at proper growth periods for potatoes;
2. It results in increased production of oats, clover, and potatoes in this region;
3. It should result in a soil of greater capacity for future production.

TABLE V.—INCREASED VALUE PER ACRE OF OATS AND HAY DUE TO APPLICATION OF 500 LBS. OF 6-12-24 FOR THE 1951 SEASON

Crop	Garrett county average	Yields on fertilized area	Cost of fertilizer	Increased return due to fertilizer*
Oats	33.1 bu/acre	70 bu/acre	$17.82	$15.39
Hay	1.29 T/acre	3 T/acre	.....	$37.62
Clover Seed	.....	172 lbs/acre	.....	$77.85
			Total	$130.86

* Cost of additional labor and combining are not included. Values used: oats at 90¢ bu., hay $22 ton, clover seed 45¢ lb.

Silver Anniversary . . .

(*From page* 5)

ments committee. As he was modestly waving them off with secret pride, a kid of about 12 years old came up and said to him, "That speech was lousy!" Overhearing the juvenile critic, the chairman tried to be consoling. "Pay no attention to that rascal, my friend. He is just the village nitwit. He never had an original idea of his own in his life. All he does is simply repeat what he hears others say!"

Thus far as for myself no village idiots have commented upon what rambling discourses I have laid before the public. But the years have brought our usual volume of correspondence which for the most part shows the tolerance for our tolerable assortments that we may expect from a rural-minded and friendly clientele. In no small measure it has been the frequent responses from our readers that has kept the steam in our boilers going without an explosion of egotism.

Profound changes have occurred in the topics and the techniques of agricultural writing and farm information during the 25 years that have so swiftly

whistled by us amid the booming of bigger guns and bombs and the bitter race between ideologies and armaments. I do not suppose that any similar span of time has wrought such help and havoc.

Gone are the rag-doll seed testers, the field selection and curing of seed corn, the care and feeding of foals, the registration and advertising of stallions, the whiskbroom and the paris green pail in the potato patch, the hoe brigades in corn and bean fields, the art of building good oat stacks, dependence on low-analysis fertilizers, running and repairing stationary gas engines, erection and adjustment of windmills, cleaning and groping with and upsetting of lanterns, installation of battery power and light plants and acetylene lamps, building stronger bull pens on every farm, milking cows and mixing and storing feed by hand, tossing manure from gutters with forks, splitting kitchen kindlings, cooking meals with wood ranges, filling cisterns and stove reservoirs, going to town only once a week, doing your poll-tax chores on the highways, running chick incubators with kerosene burners, scrubbing duds with a washboard, and beating the chickens up every morning instead of turning a light switch to start them hustling and scratching long before you do. (If you can figure out a few more maybe we can offer a prize for the "mostest.")

NO less sweeping than those things are the veritable avalanche of information media with which it is now feasible to reach the outlying farm at all hours and on all occasions. Maybe this is good because we are provided with so many more new and wonderful short-cuts and simplifiers and contrivances to adopt out there in our old valley. They claim that no agricultural research finding is more than one-fifth successful and complete until it is "disseminated" to the folks who can use it properly.

That word "disseminate" brings to mind one of the most valued mentors of my early days in farm journalism. He was a cereal missionary, an enthusiast for educating youth, and an effective inspirer, but not a highly trained scientist in the strict sense. He was always and forever out to "disseminate" something to the farmers—be it bulletins or pedigreed barley. His sturdy spirit and fervor were a last link between the vanished past of pioneering—bobcat fighting in the tall timber, sod-busting, and log-rolling—and the new era of the specialist, the organizer of cooperatives, and the partnership of soil and science. It has been a great good in my life to have counseled with such true and sometimes dogmatic and reckless reformers. They had a certain raw native ability to put things across with the generation of those times which more polished and erudite leaders could not have done so readily. I may add that this old friend has an academic hall named after him. "For," said the attentive listeners with suntanned faces, "here stands a fellow of infinite wit and skill, who has been one of us and lived among us, and yet who seeks a new light afar off and points us toward it in terms we understand." More power to extension folks today, who can couple up past personal experience and sympathy with modern methods and achievements.

I also recall in that border period of ours how other farsighted men came to the aid of farm science for the farmer. One of them, who is still active and persistent in his queries and challenges, devoted himself particularly to the revising of experiment station bulletins. He made them more attractive and readable with pictures and typographical arrangements, and persuaded many reluctant laboratory savants to use the strong Anglo-Saxon words that men built America with, instead of writing always in the lingo of the learned.

Here again certain able and amenable scientists in nutrition and genetics quickly saw the light of reason in that direction and welcomed the services of

the so-called "popular" writer, provided the copy was cleared and verified beforehand. Ironically, it was not always the scientists longest removed from cow pastures and plow handles who refused to have their research tinkered with and translated.

NOW in all this movement we are in the midst of, which seeks clarity and readability, there is and can often be an undesirable extreme. I have never found it practical to hedge myself round and about with intricate rules and syllable-counting claptrap. Of course, sometimes when you must make ample room for paid advertising, the writer has to prune and cut and abbreviate—often at great risk of incompleteness and misunderstanding.

Likewise in the field of farm information by radio we had our inspired beginners. And television is just now on the threshold of becoming the potent force it should be in rural education and culture. It will save much expense for the long trips made by extension staffs and enable emergency facts to be quickly distributed just ahead of a seeding or harvesting season, not to mention all the homecraft tricks its rays will disseminate. Too bad, however, that the old corn-husking champions are no longer thumping the bangboards, so that television might give us some athletic variety beyond the grunt and groan circuit.

Queer how things and events shift so fast and set up such a pace for the agricultural reporter to follow. Competition in this field now is stronger than it was 25 years ago. Rotogravure, offset printing, color plates, headline design, magazine face-lifting, page layouts, and brisker and crisper articles are just a few signs of the tempo afoot. In the matter of wordage alone, there is no comparison today with the large volume a farm paper scribe had to unleash two decades ago. From my own experience, I can estimate that my "take" of copy prepared in the usual way for succeeding issues of a farm journal would

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run well over four million words in that period, against about half a million turned out for my alter ego, Jeff. Yet somehow the readers came through unscathed, possibly either by surviving or ignoring it.

When I remind you that as a rule the staffs of farm paper editorial departments are larger and probably better trained in general than they averaged 25 years ago, you would naturally ask "how come?"

Well, they deal in considerably more "research," as it is called to dignify it. By this is meant assigning staff writers to certain new lines of development in economics, science, credit, cooperation, and what else have you. The individuals on the staff do less actual wordage than study. Then some have regional representatives who scour the farms and bob up with practical examples of how individuals have accepted and profited by new ideas and scientific discoveries. They usually ramble around and take their sweet time at this, without the gruelling copyhook staring them in the face in the style of daily papers. When a story is ready to spread on the books, several writers and editors go into a huddle and trim it down to size and whittle it into popular shape. It's all done in the interest of quality rather than quantity—so they tell me.

Moreover, many larger farm information offices maintain scouts who do editorial sleuthing. This year some of them are extra active for very obvious reasons, although none of them are outwardly political, in the narrow partisan sense. Other editorial hawkshaws hope to uncover scoops and scandals—mostly unheard of 25 years ago in farm journalism. But now the farm reader is strictly modern—just an extended main street resident. He must have seasoned dishes tucked into his R. F. D. box or pepped up for him over the airways. All of which shows how us elder gentry have gotten slack in the traces—for these days call for youth, personality plus, skill in scientific terminology and references, and ability to interview diplomats, generals, kings, and congressmen—so that the favorite farm periodical may not get snowed under with jazzed-up journaleese.

ALL this is progress. We never intend or expect to return to the simpler days in any field of human endeavor. He who bites his nails with frustration because he was "born too soon" is wasting time he could spend better playing canasta, or even watching Howdy Doody or the Mauling Monster of the wrestling film. Just because all these changes sneaked up on us almost unawares and very gradually, we must not sulk and snivel.

But I think most of us, rushed along as we are in the deep current of modernity, could profitably recall that saying of one of the Bible apostles—perhaps Paul himself:

"We owe a debt both to the Greeks and to the Barbarians—both to the wise and the unwise." This to me simply means that we shall never forget the contributions that have been made to argriculture and a decent rural life by humble and forgotten people. They were unacquainted with science but familiar with loss and toil and sorrow; and they left many of us a rich heritage that no scientific reports can hope to excel.

In concluding, I repeat the thanks which we have sent to countless fans and friends through the years for the confidence and good cheer which their greetings gave us. I truly say that the "first 25 years were the hardest" in conjuring up periodic sentiments behind the mask of Jeff. I can assure you, at least, that there will not be another 25 years and half a million words pecked and punched by this performer. Meanwhile, I crave both your indulgence and your ideas—for after such a long spell of bemused bewilderment it's time to broadcast the S.O.S.—Send On Suggestions!

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The American Potash Institute will be pleased to loan to educational organizations, agricultural advisory groups, responsible farm associations, and members of the fertilizer trade the motion pictures listed below. This service is free except for shipping charges.

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In the Clover (Sound, running time 25 min. on 800-ft. reel.)

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DISTRIBUTORS

Northeast: Educational Film Library, Syracuse University, Syracuse 10, N. Y.

Southeast: Vocational Film Library, Department of Agricultural Education, North Carolina State College, Raleigh, North Carolina.

Lower Mississippi Valley and Southwest: Bureau of Film Service, Department of Educational Extension, Oklahoma A & M College, Stillwater, Oklahoma.

Midwest: Visual Aid Service, University Extension, University of Illinois, Champaign, Illinois.

West: Department of Visual Education, University of California, Berkeley 4, California.
Department of Visual Education, University of California Extension, 405 Hilgard Ave., Los Angeles 24, California.
Department of Visual Instruction, Oregon State College, Corvallis, Oregon.
Bureau of Visual Teaching, State College of Washington, Pullman, Washington.

Canada: National Film Board, Ottawa, Ontario, Canada.

IMPORTANT

Requests should be made well in advance and should include information as to group before which the film is to be shown, date of exhibition (alternative dates if possible), and period of loan.

Request bookings from your nearest distributor.

Rastus: "Ah wants a divorce! Can't stand livin' wif dat woman nohow . . . she jes' talk, talk, talk night an' day."

Lawyer: "What does she talk about?"

Rastus: "She doan' say!"

* * *

Mathilda, a spinster lady, rushed into the house and exclaimed excitedly to her old maid sister: "Oh, Agatha, I'm going out tonight with a used car salesman."

"What's the difference?" Agatha assured her. "So long as he's healthy."

* * *

"Does your girl smoke?"

"Well, not quite."

* * *

"Surely I am not as fat as that woman," said the stout matron.

"Well, my dear," replied her husband, "I guess the only difference is—she pulls it and you push it."

* * *

Slightly Inebriated (to girl on Main Street): "Do you speak to strangers on the street?"

Sweet Little Thing: "Oh, no."

S. I.: "Well, then, shut up!"

* * *

A fellow driving his car with the top down was wearing a bright red shirt, a polka-dot tie, a shepherd's plaid suit, and a lavender beret. A motorcycle cop stopped him and made him pull over to the side of the road.

"What's wrong, officer?" asked the lad. "I haven't violated any traffic laws."

Said the cop: "No, I just wanted to hear you talk."

She came in with her hat over one eye, her hair ruffled, and lipstick smudged all over her face.

"What happened?" her roommate asked.

"Well, I was out with a Frenchman," she replied. "I didn't want him to know that I couldn't understand a word he said so I just kept nodding my head!"

* * *

Golf Pro.: "Now use your brassie."

Miss Vacanteye: "But I don't wear any this hot weather."

* * *

As the tightly packed elevator descended, graying Mrs. Morton became increasingly furious with her husband standing beside her. His face was flushed with delight — because the blonde girl was crowded against him.

As the elevator stopped at the main floor, the blonde suddenly whirled, slapped Mr. Morton, and said: "I'll teach you to pinch."

Bewildered, and no longer aglow, Mr. Morton was halfway to the parking lot with his wife, when he choked: "I—I didn't pinch that girl."

"Of course you didn't," said his wife consolingly. "I did."

* * *

S2: "Then I hugged her, kissed her, and looked tenderly into her eyes."

S1: "Did you say you loved her?"

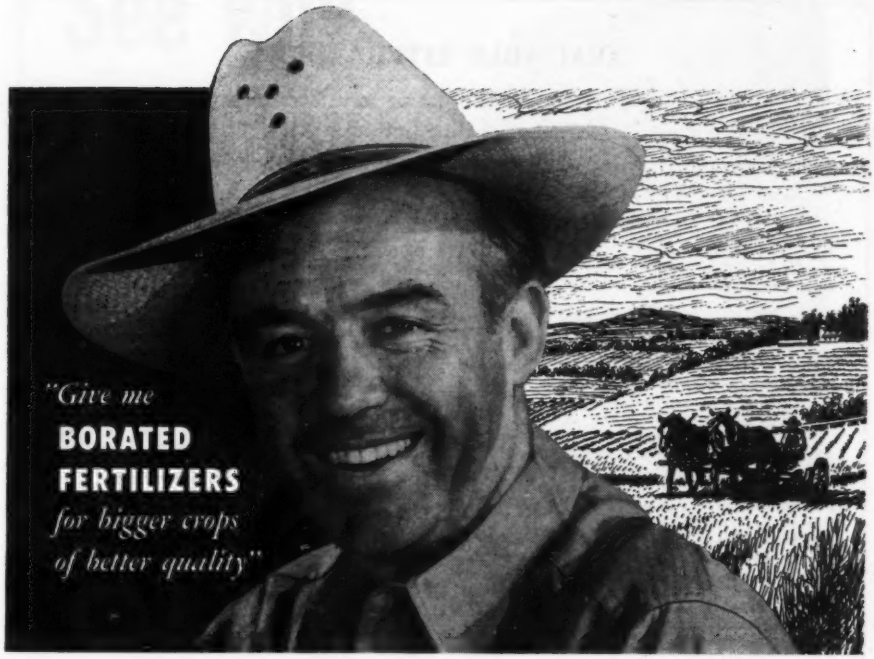
S2: "Naw . . . I'm playing hard to get."

* * *

"Operator, I want the number of the Peshenkovitz residence on Oak Street."

"Will you spell it, please?"

"Sure. O-A-K."



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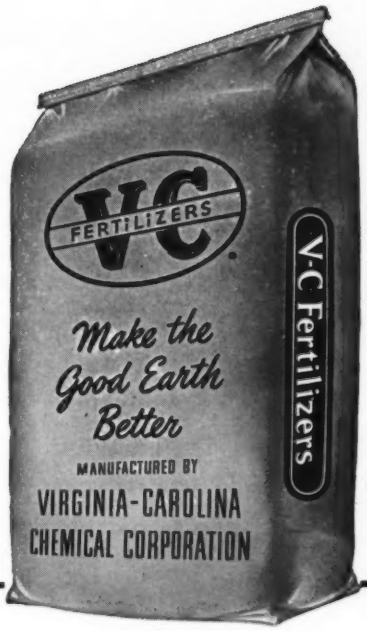

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